LIVINGSTON AND THE TOMATO.

Yours Truly
A. W. Livingston

LIVINGSTON

AND THE

TOMATO.

BEING THE HISTORY OF EXPERIENCES IN DISCOVERING THE CHOICE VARIETIES INTRODUCED BY HIM,

WITH

PRACTICAL INSTRUCTIONS FOR GROWERS.

BY

A. W. LIVINGSTON.

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INDEX.

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BIOGRAPHICAL SKETCH.

MR. A. W. LIVINGSTON belongs to that honorable race of people known in America as the Scotch-Irish. His parents came from Cambridge, New York, to Reynoldsburg, Franklin County, Ohio,—ten miles east of Columbus, the capital city. The country was a wild wilderness of primeval forests at that time—1815; and required the labor of a generation or two of hardy pioneers to clear away.

He was born in 1822, and reared to a life of pioneer farming. School privileges were very limited then, but he learned to spell, read and write well, to "cipher in arithmetic as far as the Rule of Three;" and he often relates how he was privileged to study grammar for half a day.

At seventeen years of age his mother died, leaving him at a time when early manhood rejoices in the needed sympathies which a mother can best extend. The good Book explains it, "as one whom his mother comforteth."

When twenty-one years old he went to work for a gardener of the place. He hired to work four months, at eight dollars per month, only a little over thirty cents a day. Here he received and noted valuable items of information which his ready mind quickly grasped, and

made the basis of calculations for the future. Indeed, it is one of the most striking characteristics of his mind that he was a close observer of all things that passed before his eyes. Everything different from what he had before seen was always noted; and it was followed up to the last change that might possibly occur to it, so painstaking was he to be accurate in these things. If a bird flew over his head having a new color or note of song he observed it, and watched it ever after to learn all that could be known of its habits. If a worm crawled beneath his feet he did not despise it; but noted all its goings and doings, and often became, for wise ends, the defender of those which all sought to kill. Insects, too, claimed his attention. If the Katydid sang in the same bush every evening for several months, he did not accept the statements of the learned who say (as in Webster's Unabridged Dictionary, The American Encyclopedia, and in Natural Histories) that it is the well-known large green grasshopper. It makes only similar noises to other grasshoppers, and it hops here and everywhere, never returning to the same place again at nightfall; while the Katydid is never seen but is always heard, there in the same bush or tree, from night to night, with her unchanging note, "Ka-ty-did" and "Ka-ty-did-n't." He takes nothing second-handed which he can prove for himself; and these tests he prosecutes with willfully persevering patience and zest. His interest was always keen in all kinds of plants and weeds. He was at an early age recognized among neighbors and friends as authority on them, because of

the closeness and accuracy of his observations. Being of such a turn, and when he reached his majority working for a gardener and seed-grower, no doubt made a deep impression upon his active mind and gave it an early bias and taste for that kind of business. He did not then think of becoming a seed-grower himself.

For some months longer he worked by the day at chopping, ditching, general farming, or anything that came to hand, never receiving above fifty cents a day for his work, but never lying idle. Truly times have changed for the better, though some discontented people are saying, "Oh, what hard times these are!" By this time he had grown to be a large, strong man physically, having excellent health. He had also a sunny, generous, sanguine disposition.

At twenty-three years of age he married Miss Matilda Graham, a farmer's daughter, not blessed with more of this world's goods than himself, but rich in health, womanly grace, and that sound good sense which made her an helpmeet indeed. This union was blessed in due time by ten children—seven sons and three daughters—the oldest dying in infancy and the rest still living, and most of them engaged in some department of the seed trade.

Mr. Livingston, about a year later, leased a farm of one hundred and thirteen acres for one hundred and fifty dollars per year. He engaged in farming, trading in stock, growing seed for the trade, and making experiments with vegetables in order to test his ideas about them; these were of great value in later

years. This consumed eleven years of his life, but the range of experience through which he passed during that time let him learn the ways of the world, and aided him to master the business which was soon to claim his closest attention. By this time he had accumulated enough to purchase a farm of fifty acres; and about the same time the seed-grower and dealer for whom he had formerly labored concluded to move to Iowa. He bought from him four hundred boxes of garden seeds, then out on commission. He quit farming altogether and embarked in the garden seed business exclusively. For twenty years this commission business steadily increased, until in 1877 he had four thousand four hundred boxes out in Ohio and the several surrounding States.

During these long years he continued his studies in the processes of nature, and kept on with careful experiments to secure new and improved vegetables, such as the trade demanded. He visited many state and county fairs, learning what he could, and spent hundreds of dollars to get personally acquainted with growers, and to know the special needs of market gardeners in all parts of the country. Whenever he introduced anything new and gave it his endorsement as a good thing, the leading seedsmen of the country gladly catalogued them, and do so still. One of them bought enough of trial packets, of twenty-five seeds each, to raise five hundred pounds of seed from them the first year, *without having seen them, but solely upon Mr. Livingston's reputation*. Such substantial endorsement of his integrity and ability has always been received with gratitude toward his competitors in the same line of trade.

Owing to the severe losses of '76 and '77, well remembered by seedsmen selling on commission through the merchants of the country, Mr. Livingston concluded to quit the commission business altogether, and sell direct to growers. He therefore moved to Columbus, O., and there made arrangements to carry out those plans, because he could from this point reach two-thirds of the United States in twenty-four hours. His motto from the first was, "Give every man the worth of his money," with the idea that he would be thus (on merit) secured as a permanent customer. Subsequent events have shown this to have been a wise move for all concerned. He also grew specialties on contract for other prominent seedsmen, who appreciated new vegetables of undoubted merit, and whose customers were willing to pay well for them with their endorsement.

After a few years of this work, his sons having entire charge of the business in Ohio, he set his eye upon the virgin soils of Iowa, with a view of enlarging this department of the seed business there. He moved in 1880 to the growing city of Des Moines, Iowa. Here he tested the suitability of the soil and location for seed growing, and found it to be most excellent for many kinds, and then hoped, with the consent of the firm, A. W. Livingston's Sons of Columbus, O., to have all moved in time to the new and thrifty West.

However, under the safe and upright management of his son Robert, the business in Ohio grew so rapidly and became so remunerative, that all thought of removing it West was abandoned by the above firm. But

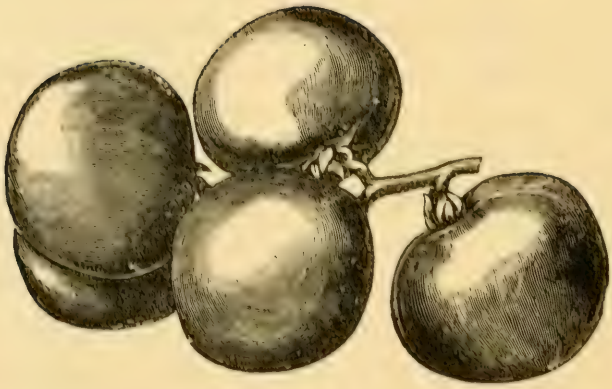
being in Iowa himself, and several sons with him, and the soil so rich and easy to work, Mr. Livingston considered it wise to remain there, and with them engage in seed raising, which he did for nearly ten years. He finally aided and encouraged a younger son, Josiah Livingston, to commence in the seed business there in Iowa's capital city.

Most of the time since he quit the commission business has been spent in experimenting with new varieties, and introducing them to the public as soon as found fixed in type and habit of growth; and also having sufficient distinctness to entitle them to a new place and a new name. The account of his experiences in the Tomato line will be found in greater detail in the early paragraphs of this volume. The whole responsibility of the business has now for some years been in the hands of his sons and their growers. By this means, and since the departure of his wife a few years ago, Mr. Livingston was given what he had always desired, *opportunity to travel everywhere, sell seeds, and learn more about the business in his own matchless way—especially what was needed for market-gardeners.* The reader cannot fail to see that, by nature, by experience, and by application, Mr. Livingston is fully qualified to do what he tells us he has done in the body of this book; and that we have reason to expect that his hints, directions, and advices on Tomato Culture will be both practical and lucretive.

Although he was so busy all his life with the work of his choice, he found time to be one of the foremost men of his community in all matters of public interest.

In hospitality, needed improvements, larger educational facilities, and disinterested liberality, he never took a second place. In the advanced reforms of his times, and in the political concerns of his country, he kept himself well-informed to date. He was no mean antagonist to meet in a hand to hand argument on the living questions of the day. He was not afraid to take advanced grounds on all important matters, but he was so good-natured himself, so fair in his treatment of those who radically differed from him, that only in a few instances did any one ever get angry at him because of his utterances. He aimed to make what he said consistent with what he did.

From early life he was connected in full membership with the United Presbyterian Church, and has been an honored officer in it almost ever since. Never is there a meeting of any kind in his home congregation, which is not blessed with his presence, counsels, and prayers. He is a man of large sympathies and vast experiences. Little children run to meet him, young people confide to him their secrets, all love to see him coming, for they will learn something useful in life, and nothing done for his comfort will escape his notice or evade his high appreciation.



INTRODUCTION.

IT has not been my purpose to write an exhaustive work on this increasingly popular fruit and vegetable. My aim has been to aid the seedsmen, growers, and canners, to know what time, labor, close application, and experience in the field have revealed to me that is practical and for their advantage in Tomato culture. Many things will not be new to the experienced grower, and ought not to be; but some things will be novel and useful to many of my readers.

I express my indebtedness to my fellow-seedsmen, with many of whom, in different parts of the country, I have exchanged ideas and experiences *about the Tomato*, with all freedom. While we do not endorse all the conclusions to which experimenters come, and publish in their Bulletins, yet we strongly endorse the work in which they are engaged, and acknowledge many useful suggestions from them, to some of which we give place here. It would be vastly better for growers if they were, for all kinds of crops, to take advantage of these public aids provided for their special benefit by the States in which they live. Many good points I have had first suggested to my mind by the frankness with

which our customers relate their experiences with their crops. Especially do I acknowledge the aid from growers whose ideas and conclusions I have included here with my own, in order to get to my attentive reader the greatest amount of knowledge in the most readable shape.

Trusting that whoever is influenced by these pages may reap as the fruits of his labor an abundant harvest, I submit this little book to the thoughtful consideration of my readers.

THE AUTHOR.

Columbus, Ohio.

Livingston and the Tomatoes.

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1. The First Tomato I Ever Saw.—Well do I remember the first tomato I ever saw. I was ten years old, and was running down one of those old-fashioned lanes, on either side of which was the high rail fence, then so familiar to all Ohio people. Its rosy cheeks lighted up one of these fence-corners, and arrested my youthful attention.

I quickly gathered a few of them in my hands, and took them to my mother to ask, "What they were?" As soon as she saw me with them, she cried out, "You must not eat them, my child. They must be poison, for even the hogs will not eat them."

"But what are they, mother?" I asked.

"Some call them 'Jerusalem Apples;' others say they are 'Love Apples;' but, now mind, you are not to eat them. You may go and put them on the mantel, they are only fit to be seen for their beauty."

This I did, adding purple and yellow ones to this red one, and soon had quite a collection on display. The wild tomatoes bore small, hollow, tough, sour, watery fruit. They were no more like the new and

improved varieties of to-day than the Pennyroyal cattle then, were like the Shorthorns now seen in our pastures everywhere.

From that early date the tomato became an object of special interest to me. Little did I then think, or for many years afterwards, that it was destined to make my name famous among seedsmen, market gardeners, canners, and horticulturists the world over. Nor could I any better foresee that it would furnish myself, my children, and my children's children, the necessaries and many of the comforts of life.

Thus it ever is: Dame Nature richly rewards those who keep close to her methods of operation, and who are not ashamed to remain tied to her apron-strings.

As the years passed by reckless people began to eat them, and as it became generally known that they were not poisonous, they came into more general use. New and slightly improved kinds were soon put on the market; but all efforts in this line for years did not get anything other than rough, imperfect fruits.

2. My Aim.—Years had come and gone with me, as the reader will see by reference to the sketch of my life in the opening of this book. My aim from the first was to grow tomatoes smooth in contour, uniform in size, and better flavored. Here my habits of close observation upon the processes of nature in all matters of reproduction stood me in good hand, but were not equal to the task by the method which I tried at first. For I tried the best kinds then known to the public, and se-

lected from these such SPECIMEN TOMATOES as approached in qualities what was needed, or was in demand. The seed from these were carefully saved, and when planted were given the best cultivation possible, hoping in this way to attain what I desired. After fifteen years of the most scrupulous care and labor of this kind, I was no nearer the goal than when I started in the race. According to laws of life, now well known, but which I did not then understand, such stock-seed would reproduce every trace of their ancestry, viz., thin-fleshed, rough, and undesirable fruits. I ran this method through all its changes, for the demand was constantly increasing, and I desired to get a distinct variety that would have good qualities and produce after its kind. Like many others who were striving for the same thing, I wanted it very badly.

Some improvements, however, were attained, but mostly by improved conditions only, and as soon as gained in the least degree, they were put upon the market under various names; such were the Fejee, the Perfected, the Conqueror, the Canada Victor, the Tilden, the Trophy, and others. With these, with my own, and with any others I could get hold of that promised me any gain, I tried again and again by varied selections of specimens and good cultivation, to attain the desired end. But I failed altogether. After such long and repeated failures it was with little hope that I turned to other methods. I did not like to give up, "whipped out entirely," in any matter I had set my mind and heart upon, as I had in this thing; and I reasoned that I might

better be trying whatever came to hand to do, than to do nothing. So I kept a watchful eye upon my fields for any "*leadings*" that promised to afford me the smooth, well-flavored fruit, as we see it now in all the markets of the world.

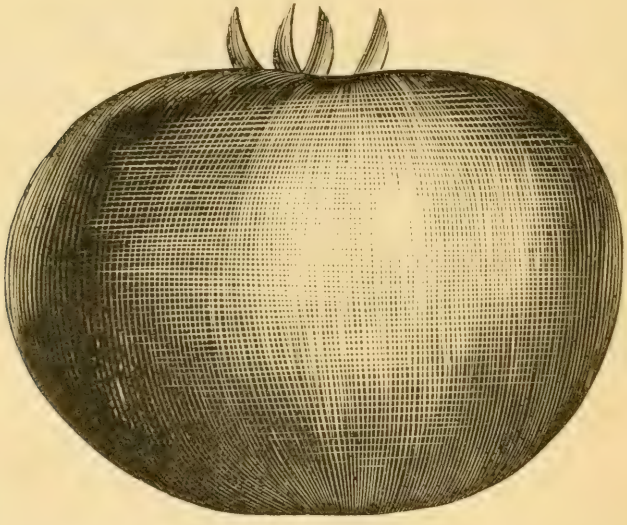
3. My New Method.—Whether this method I here describe was new to others at that time (in the Sixties) I did not know, but it was altogether new to me; in fact it was a pure discovery on my part. Let my readers note that an ounce of experience is worth a ton of theorizing. I am giving actual experiences. The learned or unlearned may alike think as they will, but I know I got what no living man had before. There was not in the United States at that time an acre of tomatoes from which a bushel of uniformly smooth tomatoes could be gathered, as they are now grown everywhere. I know, also, that I secured this result by the method I hereafter describe. I know, too, that I can repeat the process at will, securing new varieties which will again produce after their kind; and, at least, under my cultivation, will never deteriorate, or "run out." For they are ORIGINAL, DISTINCT VARIETIES, and will bring forth their like, as will anything else; and they are as capable of being cultivated into "strains" as are those of cattle, hogs, chickens, or other plants and fruits of distinct kinds. The same laws of life and breeding govern tomatoes as in any other form of life, for all the processes of nature are so simple that few will believe them, even when they are pointed out to them. With these preliminary remarks I describe my new method.

In passing over my fields of growing tomatoes, which were still of all sizes, sorts and shapes, my attention was attracted to a TOMATO PLANT having distinct characteristics, and bearing heavy foliage. It was unlike any other in the field, or that I had ever seen. It showed itself very prolific, its fruit was uniformly smooth, but too small to be of general market value. As I examined it closely, observing how alike every tomato was on the stalk, wishing they were larger, and meditated over its possibilities long, it came to me like an inspiration, "WHY NOT SELECT SPECIAL TOMATO PLANTS instead of SPECIMEN TOMATOES." At any rate, I acted at once on this idea. The seeds from this plant were saved with pains-taking care, and made the basis of future experiments. The next spring, from these seeds, I set two rows across my garden—about forty rods long each—and to my glad surprise they all bore perfect tomatoes like the parent vine. I felt that

> My battle was half won,
> My race, too, half run.

They were a little larger, for which I also rejoiced, as I hoped to bring them up by choice cultivation to what would now be considered a medium-sized tomato, which I then thought, and still think, to be the most profitable size. The seeds from this crop were again carefully harvested, but from the first ripe and best specimens I selected stock for my own planting. By good cultivation and wise selection from season to season, not to exceed five years, it took on flesh, size, and improved

qualities. I then put it on the general market. This was in 1870. Although grown and sold extensively all these years to date, and although cultivated into various "strains" by different growers according to their particular fancies, it is to-day the same distinct variety which it was at the first. On account of its superior excellence in comparison with all others in the market at that time, I called it "THE PARAGON TOMATO."



PARAGON TOMATO.

4. Livingston's Paragon Tomato.—It was the first perfectly and uniformly smooth tomato ever introduced to the American public, or, so far as I have ever learned, the first introduced to the world. In color it is a blood red. It has a strong, vigorous stalk; heavy foliage; is a very hardy plant; will bear shipping of its plants well; grows shoots or branches near the roots

later in the season, which bring a late crop equal in size, quality, and evenness of ripening, to that grown earlier on the center stem; and with its heavy foliage it endures early frosts longer, and still produces crops when the price is usually good. It is very prolific, a little late, but is a most popular tomato as the annual sales of seeds still show. From the very first of its history to this day, where acres were planted not a rough or inferior tomato could be found in the entire fields.

This discovery, like all others, soon produced a revolution. As a general field-crop tomato culture had been of little general interest up to this date. To be sure, Mr. Harrison W. Crosby canned and sold the tomato as far back as the year 1848, but that which caused it to increase phenomenally, and rival the potato as a profitable crop to grow, was the discovery of the Paragon, and the universally smooth varieties that followed it. With these, tomato culture began at once to be one of the great enterprises of the country. Demands of market gardeners soon called for other varieties, which I supplied as they became clearly defined to me.

5. Livingston's Acme Tomato.—Several varieties of a purple color had gone upon our markets, such as the Fejee and the Perfected, with some others. They produced somewhat after their kinds, but always required a liberal "CULLING OUT" of inferior specimens. Yet many market gardeners, especially in the Western States, became partial to a purple-colored tomato; and this taste still prevails. As my Paragon was red, and

too late for early, and as I wished to try again the method by which I had discovered the Paragon, I set about to secure an early purple tomato. I selected from a field of growing tomatoes, as before, A PLANT which bore small, uniform, early tomatoes, and which had its own peculiarly marked characteristics: such as recommended it to my judgment as being the tomato to meet the demands of the trade at that time. I saved the seeds

carefully, cultivated it up in a few years, and introduced it in 1875 as a perfectly new and distinct variety, under the name, "The Acme Tomato."

It is lighter in foliage than that of the Paragon, and much earlier. In fact it is the earliest of the uniformly smooth varieties to the present time. A most careful experimenter says: "Last year the Acme was two days later than the Mayflower, this year it is seven days

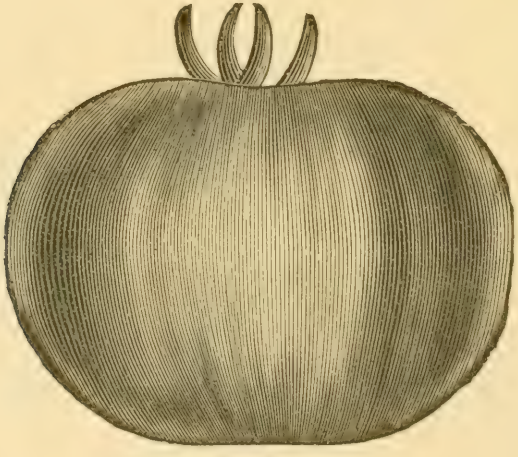
earlier. Last year Acme was seven days earlier than Paragon, this year thirty days earlier. Last year it ripened with the Trophy, while this year it was eleven days earlier than all others."

Other kinds will often have one or two "first early ripe" tomatoes on the stalk, while Acme will be earlier and have a far greater number of "first early" to the stalk than others. Mr. Wm. Meggat, the wholesale seed-grower, says, "In 1890 I tried Acme with 115 other varieties, and found the first ripe fruit on it." By special cultivation as described in Paragraphs 45, 49, it will show to still better advantage for earliness.

It is of a bright purple color, very tender, and fine fleshed. It is specially grown for home uses, but is also a good general-purpose tomato. Many prefer it above all others. In fertility, foliage, growth, earliness, smoothness, size and color, its distinct type is clearly all it was seventeen years ago. In 1890 I grew some plants to test this matter, from stock seed of 1880—ten years old; and the result showed them to be exactly what they had been ten years before, viz., distinct and true to kind. They are, as stockmen would say, "thoroughbred;" and, at least under our cultivation, show no disposition to "*run out.*"

6. Livingston's Perfection Tomato.—I found in my Paragon and Acme fields while growing, an occasional "sport" (as it were, one in a thousand), which was yet quite distinct from either of the above varieties. By experiment I found that these retained their

peculiarities perfectly. The thought then occurred to me that I might secure improved kinds more easily and quickly than from fields of all sorts, as I had done in the other two already introduced. I was urged to secure a new tomato because a good shipper was in demand, for tomatoes were being shipped in large quantities from country towns and places into the large cities, and from



LIVINGSTON'S PERFECTION.

the far South into the North. At any rate I selected a plant from a field of Acme (a purple tomato) and secured what is known everywhere as Livington's Perfection Tomato—a blood red tomato—which I introduced in 1880. The stalk and foliage are lighter than those of the Paragon, but stronger than those of the Acme. The fruit is uniformly smooth like the others, only it is a little flatter from the stem to the blossom ends. Its blood red color is very desirable, meeting the fancies of

the public, especially in the Eastern markets. One particular advantage it has as a shipper, is that it begins to show ripening several days before it is fully ripe. It also has a thick, tough skin, which is not easily broken in transit. With this kind, inexperienced hands or pickers in the South, if directed to gather only those fully grown and showing a tinge of ripening, can be employed to gather the fruit: and the grower will not get it into the distant market green, wilted or spotted. This is a good tomato for bulk of crop, almost anywhere and everywhere.

LIVINGSTON'S GOLDEN QUEEN.

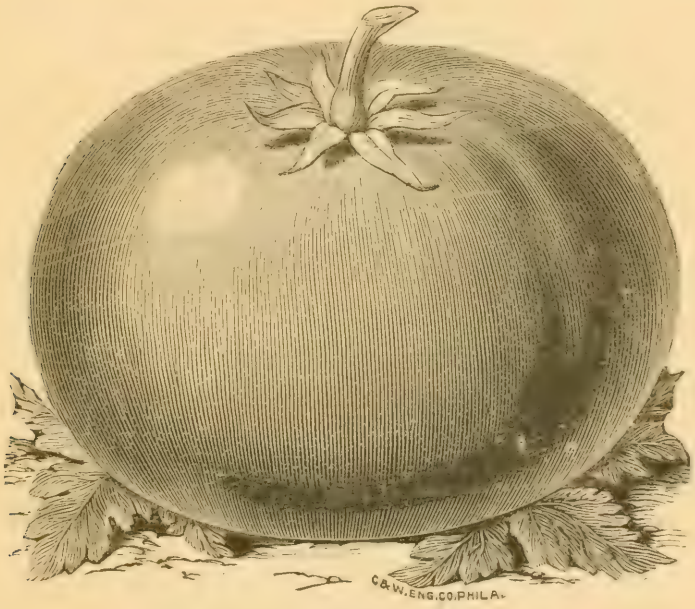
7. Livingston's Golden Queen Tomato.—In one of the county fairs which I often attended for the purpose of selling seeds, I saw a very pretty yellow tomato. As I was examining it closely, and admiring it, the owner saw fit to make me a present of one of them, which I prized highly, and took special care to preserve, test and improve. I had it a number of years before I

introduced it; but in 1882 I thought it advisable to give it a wider circulation, and so advertised it extensively under the above name. It is of a bright golden yellow color, uniformly smooth, good size, most prolific, early ripening, and is a first-class, all-purpose tomato. It is admitted to be the best flavored tomato in existence. It is often used by the busy housewife when she puts sliced tomatoes on her table to good advantage, by alternating layers of this yellow with red or purple varieties. It makes a dish, with proper seasoning, dainty and attractive enough for a king.

8. Livingston's Favorite Tomato.—By this time the fruit canning business had grown extensively, and tomatoes came in for a large share of this trade. I made it my business, as I traveled about the country, to learn the demands of these canning establishments, viz., what qualities in a tomato were peculiarly suited to their trade? Then, in order to meet the canners' desires, I selected from a field of Paragons a tomato quite distinct from it, as any one can see who grows them side by side in the field. This new tomato I improved, and introduced in 1883, naming it *Livingston's Favorite Tomato.*

It is an early, blood-red, smooth, and most prolific tomato. It has no open spaces about the seeds in cavity, or ridges and hollows from stem to blossom ends. It ripens evenly, is a solid, meaty tomato, and has thicker flesh parts, of finer fibre, than any other used up to that time. They are of fine, large size. One grower writes us from Wisconsin, "I grew them fourteen and a half inches in

circumference." Another, from Maryland, says, "I put up 5,065 cases tomatoes off of eighteen acres of your Favorites." A large canner in Iowa told us, "I get one and a half to two cans per bushel more from Livingston's Favorites than from other tomatoes." He also



LIVINGSTON'S FAVORITE.

claimed that in a day's run of forty thousand cans this difference in favor of the Favorite made him over eight hundred extra cans above any other tomato he ever used. This one fact shows the importance of canners looking well after the kinds their growers raise for them.

9. Livingston's Beauty Tomato.—I discovered that nearly all market gardeners, at least west of Pennsylvania, were determined to have a purple-colored

tomato for their trade. I had also learned that new kinds selected from the Paragon fields (a red-colored tomato) possessed more vigor of stalk, and preserved well all the other qualities so desirable in any tomato. I began to watch for a new tomato, which would be the market gardener's pride and profit.

Being a practical gardener of many years' experience myself, I had much advantage over those who were only seedsmen, or mere experimenters, in knowing exactly what was needed to supply this demand; and I was not slow to take this advantage for the good of all. In due time, and by the same processes as in its predecessors, my labor was rewarded with what I claim to be THE CROWN JEWEL OF THEM ALL. It has a stouter stalk than the Acme; heavier foliage, that protects it from the scalding hot sun; is slightly darker in its purple color; almost, if not equally, as early, and much larger than Acme, being deeper through from stem to blossom ends. It is a constant bearer, "holding up" its size on till the frosts kill the vines. It is particularly productive; when the fruit is left on a single vine to see how many can be picked off ripe at one time, it is not uncommon to gather a peck at a single picking. Neither has it a useless green, hard core in the center. What is usually a hard, unripe center in others, is in this, and in all my kinds, as good as any other part of it for food. The seed cavities are small, and contain few seeds; it ripens all over and through at the same time, and is freest from skin cracks or "Black Rot." It is a splendid shipper, and was [illegible] first

purple tomato that obtained extensive sales in the Eastern markets. The attention of shippers in the South is especially directed to this variety, because their success depends on a kind that will "*hold up under*" shipments for long distances. An extensive shipper

from Mississippi tells us, "I had 'Beauties' on open freight for nine days, and they came out all right." It was introduced in 1886, and it is now sold by all leading seedsmen in the world more largely than any other. It requires almost two and a half tons of seed from this kind alone, to serve our own customers in their annual demands, and other seedsmen also sell large quantities of it.

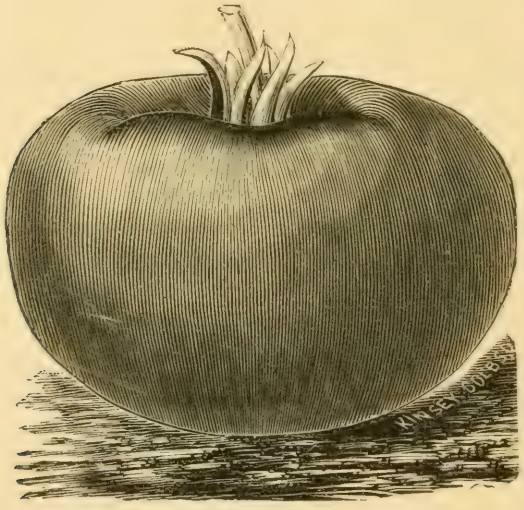
10. Selling Under Seal.—I dislike very much to say anything against others in the same line of trade with myself; or anything that may even sound like it; for I claim to be one of the last men on earth who grows "sore-headed" over the successes of my competitors. I am also aware that if I do myself, and my tomatoes, common justice in this book, that I lay myself liable to be charged with an "*ad scheme;*" but as I write experiences here, it came to pass that, because of designing

persons unjustly seeking to enter upon other men's labors, we were compelled to do as many other seedsmen did with other new vegetables, viz., "SELL UNDER SEAL." This was a necessity to preserve our own reputation as upright seedsmen, and to keep the names which we had wisely selected for each of our new tomatoes. They were justly popular, but I found that they were sold under various other names; that many were mixed

or crossed with other kinds, and so impure; I learned, also, that even our own kinds were sold under each other's names, or those of other well-known varieties: and thousands of dollars' worth of seed are still sold in the same way each year, although it is palpably dishonest by all those who do it knowingly. Beauty, and all purple tomatoes, are sold in Chicago for Acmes. About Detroit, Beauty tomatoes are sold under the local name "Fejee." In Florida it is sold for "Improved Acme." In Baltimore it is sold as "Prize-taker," while Paragon is sold as "The Queen" tomato. Each of the other kinds have met the same fate. We grow on our experimental garden many leading varieties other than our own, and by actual comparison are led to believe that because of similar characteristics, and also that introducers refuse to give an account of the origin of their new tomatoes, that many are simply the renaming of our popular kinds. Clearest proofs, multiplied, could be given of these, and similar things: and they *will* be given to anyone entitled to know them of us. But now we sell under Seal, ONLY OUR OWN VARIETIES, and these alone when grown near at hand, under our own supervision. When that stock is exhausted, we do not buy of other firms, but quit selling under seal.

11. Livingston's Potato-Leaf Tomato.—Many growers had heavy clay lands, and needed a tomato adapted to this kind of soil, and still prove a heavy cropper. The Potato-Leaf, which I introduced in 1887, was

found well calculated to meet this demand. I had it ready before I got the Beauty, but considered it wiser to let it wait until a *sweepstakes* tomato, like the Beauty, was well under way. Its leaf resembles that of the Irish potato, hence its name. It is like the Mikado or Turner's Hybrid, in *foliage* only; in every respect they differ in their *fruits*. It is of fine flavor, uniformly smooth,

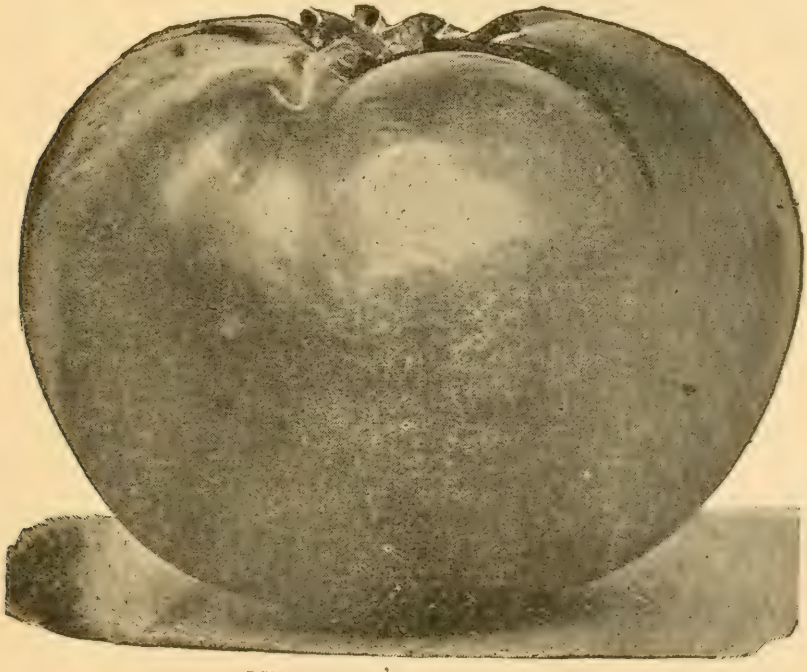


LIVINGSTON'S POTATO-LEAF.

deep through, good size, a bright, glossy, purple color, an excellent producer, and is especially suited for "staking up," or "Trellising." See Paragraphs 45 and 49.

This Tomato, because of its right size and glossy purple color is of all the purple varieties the best adapted for canning whole, which is in the Eastern parts of the country now becoming very common and popular.

12. Livingston's New Stone Tomato. — The American public is not satisfied with old things, however good they may be. I was asked almost every day, while "on the road," "Have you anything new in the tomato line?" Now, although customers had made it plain by thousands of unsought testimonials to those



LIVINGSTON'S NEW STONE.

already introduced, that there was very little opportunity left for improvement in tomatoes, I yet found it wise to put out new ones from time to time. Of course there was less difference between these and those I first introduced, than between my first and all kinds which preceded them. It was always my aim to please my

customers, and so I made these little improvements as it became clearly necessary for the grower's profit. The New Stone was found between rows of Beauty and Favorite, in the fields of one of our careful growers. It was perfected as a distinct variety, and introduced in 1889. It is blood-red in color, shaped like the Beauty —see Paragraph 9—and is the largest smooth red tomato on the markets. It is the heaviest for its size or compass of all others; therefore its name, "Stone." Some growers claim they can tell it from others of the same size in the dark, because of its greater weight and solidity. It comes more nearly combining the good qualities of all the red tomatoes preceding it than any others of any name. No red tomato carries its size throughout the season better, none are more prolific, none are better adapted for all purposes, none have pleased our growers better in the same length of time since its introduction. In my judgment the coming tomatoes that will hold the highest rank, and wear the longest with those who grow them for the money they will make them, are, for purple color, "The Beauty;" for red color, "The New Stone."

13. Livingston's Royal Red Tomato.—It was found among Dwarf Champion fields. These were purple tomatoes, while the Royal Red is a bright scarlet—the reddest tomato through and through yet introduced by us or others. I found that large quantities of tomatoes were used in the manufacture of catsup, and also for canning whole in bottles. This very decided red

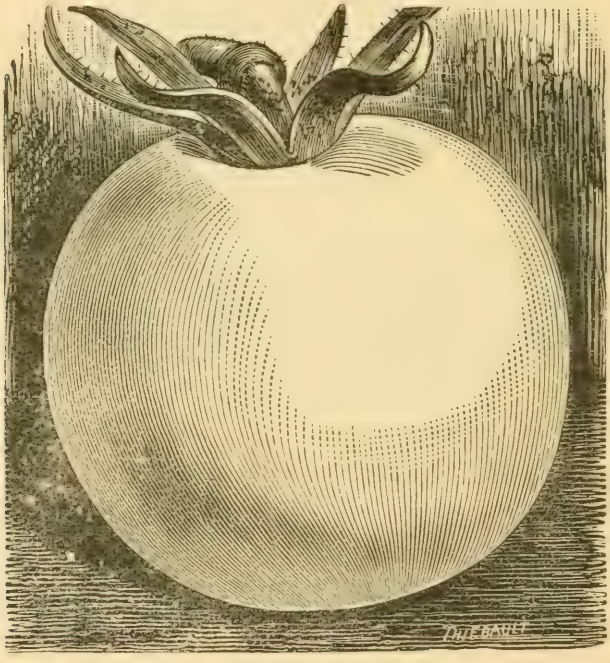
color was in demand for these purposes; so it was introduced as "Livingston's Royal Red," in 1891. It is a first-rate general purpose tomato, however. It carries in high degree most of the good qualities of the older

LIVINGSTON'S ROYAL RED.

ones I have introduced. In size, smoothness, productiveness, solidity, and beautiful appearance, it will please the most fastidious. When on exhibition at our Fairs it attracts more attention than any other of the red varieties.

14. Livingston's Gold Ball Tomato.—The little yellow Egg, or Plum Tomato, which people ate raw in their gardens, and used so extensively for preserves, suggested to my mind that a new and improved variety for the same purposes might be very acceptable. One of

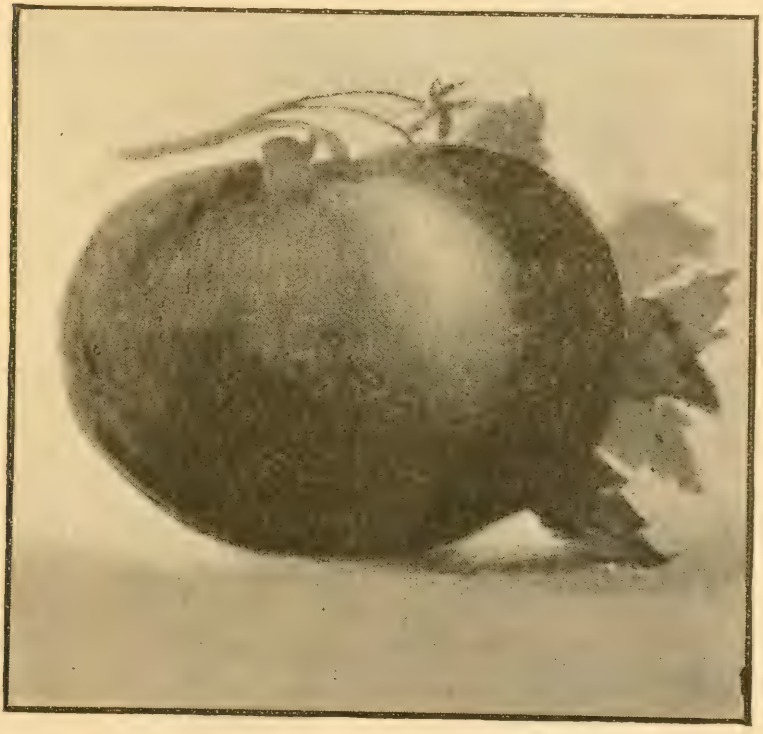
our best growers found it among his growing tomatoes, and it was introduced in 1892. It is a bright golden yellow, round as a ball, one and one-half inches in diameter; it has few seeds, abundance of flesh, and is so very productive that some single plants have borne a half bushel of fruit. The tomatoes will, without injury,



LIVINGSTON'S GOLD BALL.

hang on the vine in clusters a week or ten days after fully ripe. I consider this gem of a tomato the best I have ever seen for preserves. No thrifty housewife who once fixes her eyes upon this Ball of Beauty will ever let it go from her garden or table.

15. Livingston's Buckeye State Tomato.— Lately considerable excitement among ambitious seedsmen has been experienced over very large fruited tomatoes. Now this furnishes me with an opportunity



LIVINGSTON'S BUCKEYE STATE.

for which I have waited long. I have had this one, named as above, from the very first of my all-smooth varieties; I did not introduce it, because it seemed to me too large for general use. It is the largest uniformly smooth one in the markets that carries with it all the

qualities I have described as belonging to all others of my great family of tomatoes.

As there is now a demand for large specimens, I entrust mine to the judgment and experience of the tomato growing public in the year 1893. There is nothing coarse or rough about this fruit. It ripens quite *early*, is a tomato for home use and for the home market; a vigorous grower, has no green end or useless core, and few seeds; is of fine flavor, purple color, and grows in mammoth clusters of from six to ten in a cluster, many of which will weigh from one to one and a half pounds apiece. It is also a very profitable kind to stake up or trellis. See Paragraphs 45 and 49.

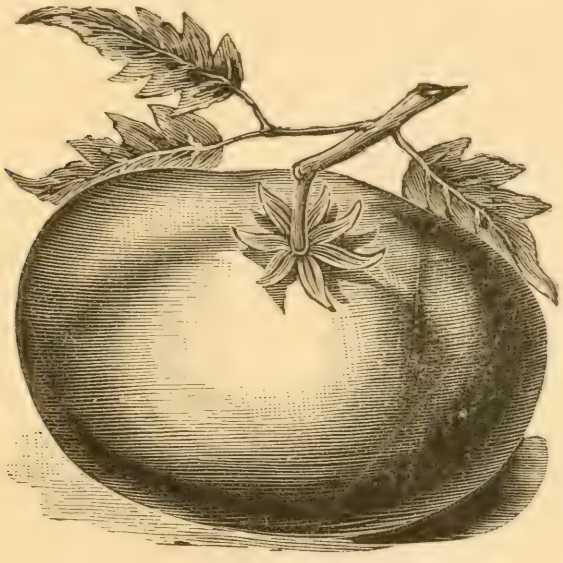
16. Livingston's New Dwarf Aristocrat Tomato.—It would seem after all that has been said of the tomatoes already described, that no more could be added, or any other improvements made on them; yet there are many more points of excellence to be attained, some of which I claim are found in this new dwarf tomato which will be introduced this year—1893. It has a strong, erect, bushy stalk, that is often one and a half inches in diameter. Because of its erect bearing and dressy appearance it is called "The Aristocrat." The plants are so stalky and stiff from the time they come out of the ground that they reset without wilting or falling down, and are therefore not stunted; nearly a week on "*first early*" is gained in this way. Plants can be set much closer than those of other varieties; at least one-half more will be required to set the same plot of


LIVINGSTON'S NEW
DWARF
ARISTOCRAT

ground. With this advantage, and their extra productiveness, I believe under special cultivation they will produce one-third more to the acre than other kinds. It begins to bear with the earliest varieties, and does not cease bearing until frosts kill the vines. Yet because of its erectness, bushy habits, and close standing in the field, it is saved from the early frosts, and only the hard freezes in the fall will reach the fruit hid up under its foliage, and thus bears abundantly when other kinds have been entirely killed. The fruit has the peculiar quality of keeping in a dry, cool room, before decay sets in, for three or four weeks after they cannot longer be trusted in the open field. It is also a large sized tomato, of a bright glossy red color, very fine fleshed and flavored, uniformly smooth, and is an all-purpose tomato for shippers, canners, market gardeners, and for fancy and remunerative home-culture. In a word, it carries the good qualities of its forerunners among my varieties, and has some others peculiar to itself. I prophesy a brilliant future for our Aristocrat.

17. Livingston's Large Rose Peach Tomato.—This sort originated with us and has all the general characteristics belonging to this singular and distinct class of tomatoes, but is much larger than any peach variety yet brought out, averaging about with the Acme in size. We have grown it for several years on our trial grounds here, and are well pleased with it. We pronounce it *rot proof* because we have not observed a single specimen showing any sign of rot in the past three years of

its growth. It is a profuse bearer until killed by repeated frost, and has the agreeable, mild flavor as well as the suffused coloring and the peculiar peach-like bloom on its surface. We presume that the texture of the skin accounts for its never rotting, and we think for



LIVINGSTON'S LARGE ROSE PEACH.

the same reason it would be well adapted for growing in certain hot climates where the ordinary tomato cannot be successfully grown. It is certainly worthy of extended trial.

I HAVE now given the reader a history of the principal varieties already introduced. They were each secured to meet certain clearly defined demands arising in the tomato trade. If there is any demand which has not been reasonably met, I acknowledge frankly that I do not know what it is. Some will say, "This is a big-pictured advertisement." Now, I am free to admit that I am not blind to the fact that what I have related will advertise us among the readers of this book; but we will not allow that we are dealing with anything but the facts in the case. If facts advertise me, that is as legitimately mine as the tomatoes I have introduced; and no one is injured if I claim my own. It can be no loss to the grower, nor to my fellow-seedsmen who catalogue my tomato seeds from year to year, and sell large quantities of them; nor yet to the consumer who partakes of new and improved fruits. It will now be necessary to consider some of the questions relating to kinds, which many growers and others are continually asking, and which have been written about so variously, that "I, also, will show mine opinion."

18. "Will your varieties 'run out?'"—Under our cultivation, having our distinct kinds as a basis, there is no such thing as the degeneracy of the kinds. I have sweet corn kept pure and improving for forty-one years; and cabbage so, for thirty-five years; and

tomatoes so, for twenty-six years. I see the same laws of life that govern pedigreed stock in animals, control in tomato life. If one has a distinct variety, and keeps it pure, and cultivated up, it cannot degenerate. All experience is against the idea of degeneracy: unless left to itself, to mix in foreign blood, to get under conditions unfavorable for its true and best developments. I am aware that it will not do to set out tomato plants that come up of themselves from the last year's crop, even when that crop was considered pure stock. It is left to itself, and whatever of bad nature there may be in it, is sure to come out. This I know to be a fact—volunteers will not do to use, although no one exactly knows why it is so. This does not argue, however, that a distinct kind, kept pure and cultivated under proper conditions, will degenerate; at least, mine do not "run out."

19. "Can we cross kinds and get new ones?" That is, if I plant several kinds, such as Beauty, Mikado, and Dwarf Champion, together in the same field, so that they will mix in the bloom, can I get from a mongrel, thus produced, a new and distinct variety that will produce after its kind, and be better than either of the above varieties? In answer to this question let me say, I have no confidence in hybridizing or crossing as a method of securing new varieties. I am not likely to forget my failures for fifteen years, nor the lessons which they taught me. Like begets like. Rough ones beget rough ones. From an imperfect kind uniformly perfect

specimens cannot come. "Blood will tell," and the imperfections will appear; and this will be true if there is the least bad blood in either of the kinds that may be crossed. If the Trophy is crossed with the Paragon the result will be an improvement on Trophy, but rough ones will still appear among them, and more "culls" will appear. This fact can be easily proven in practice, even where for several generations these bad qualities had not been much seen, for some unaccountable reasons they will begin to appear again. This is what is known as "breeding back," among the stockmen, but is just as true of tomatoes as of anything else. If any one breeds crosses upon crosses, no one can tell what the result will be. Yet trying to *breed in* certain good qualities by crossing those that do not have them with some that do, while at the same time certain bad qualities would be *bred out* by the same process, must ever prove a failure, simply because it violates the very constitution of things, viz.: "Whose seed is in itself yielding fruit after his kind." I see some seedsmen are advertising this year, 1893, in their catalogues, the seeds of fifty different kinds of tomatoes in one packet. No one will get a new and valuable kind from seed of such a mixed lot, for they will not produce after the nice specimen tomatoes one may select from them. It would be better to do as I did—select A PLANT of decided markings of stalk, leaf, size, quality of fruit to taste; for if you happened upon an original variety it would then come true to kind; otherwise, never in the world; for it might in any season "breed back" to the time when Jacob traded lentils to

Esau for his birthright. It is no manner of use wasting time on seed from crosses for stock seed. As well build a mill high on the hill and expect the water to run up there of its own accord to drive the machinery. It violates nature, and it can't be done that way. The whole trick in getting new varieties is in knowing which plants are original kinds, and those that will, under cultivation, take on size, flesh, and desired qualities, WITHOUT ANY INFUSION OF FOREIGN BLOOD. No doubt, on this subject, there is much of mystery as yet, just as there is on all subjects connected with life, which is itself a profound mystery. However, this makes it all the more inviting field for scrutinizing investigations.

20. Can distinct varieties be cultivated into different "strains?"—Each plant has its range of possibilities; that is, it can grow larger or smaller than a standard size, a little darker or lighter in color, a little more sour or sweet; and so on, covering all of its qualities. I suppose The Creator gave it these capacities to change in order to adapt itself to varying conditions under which it might have to grow, and still continue itself from year to year. Each plant has its limitations however, beyond which it cannot be cultivated. No amount of cultivation (or putting it under the most favorable circumstances to develop to its utmost) would grow a Yellow Egg Tomato into a Golden Queen, because "The Queen" has capacities beyond the limitations of "The Egg" tomato. Hence if we get Queen tomatoes we must not try to get them by cultivating up the Egg, but get a new and distinct variety.

There may be another reason why the Creator has arranged things in this way, viz.: it affords opportunity to gratify a great variety of tastes; suppose, as a gardener, I prefer "The Beauty" tomato to any other one kind. As I grow it from year to year, and observe it closely, I discover these variations in its qualities. I see some larger or smaller, some darker or lighter, some heavier or of less weight, and so on. At once my preferences would lead me to select for my stock-seed from specimen plants and tomatoes those which I thought best. Now, this process kept up for a number of years will produce what would be properly called my "Strain of Beauties." Yet let it not be forgotten, it would never become anything other than a Beauty.

Now, in point of fact, as I visit the fields of many careful tomato growers each year, the evidences of this very thing comes to my eyes. I will not be successfully contradicted when I say, there are to-day among gardeners, many strains of Paragon, of Beauty, and of other popular varieties. I sincerely hope, too, that the reader will not fail to consider that only distinct kinds are capable of being cultivated into decided "strains;" and this in turn, proves that my kinds are new and distinct.

For this reason, and because of many observations made in all parts of this country, I have great difficulty to see how any originator has got, even aproximately smooth tomatoes from rough kinds, without a strong infusion of blood from some of my distinctly smooth varieties. In our trial gardens are raised many well-known principal kinds: and there are none of them but

show a proportion of rough ones among them. There is, so far as I know, very little literature upon how originators secured the kinds they claim are new and distinct varieties, and which they introduce under various names. It would be of immense interest to me, and I judge to growers in general, to learn how they got them. I, for myself, would like to learn many things from these men if they are sending out those that are really new and distinct; but if they send out only "crosses," or "strains," as such, one would only smile at the effort, but expect no permanent results from it. I suspect, at least, that such efforts account for the prevailing opinion that the life of any distinct kind of tomato is only ten years.

21. Selected Stock-Seed. — We should have among seedsmen, for the benefit of growers, something which would procure the same end as the pedigrees of animals to be used for breeding purposes. Stock-seed should be selected, year by year, from the discovery of any new kind, so long as there is any demand for it, by the wisest and best growers in the land. All admit the necessity and advantages of such care, such cultivation, and such selections; but few go to the expense to do this. Concerning all the kinds introduced and before described, I can say they are really pedigreed tomatoes. From the day of their discovery to this day, they have been under our hands; so we know what we have, and what they will produce. Only a few men have been found who can be entrusted to save selected stock for

us, and raise from it reliable seeds for our customers. These are well paid for this very responsible labor, and they can make a business of it, and so we keep our tomato seeds up to the standard type. All my varieties, nearly, are general and special purpose tomatoes. All are smooth—to a tomato—not a rough one can be found in acres, as we grow them. A son of Mr. Landreth, the seedsman, in the fall of 1892, at his own request, was taken over the fields of my different kinds in the trial gardens. After going through all the fields, he was challenged to say whether he had seen a single rough one among all of my own varieties, but he could not say that he had. The fact is, they are absolutely and uniformly smooth in contour. All ripen evenly, all over and through, at the same time. Not one has a useless core, or hard stem end; the whole tomato is all alike edible. All grow in clusters, and so are more prolific. All possess the greatest possible solidity in the smallest possible compass. And all are new and distinct varieties, producing after their kind.

While traveling, I am often asked to buy tomato seed. I could buy it by the hundred pounds at twelve cents to forty cents per pound. I know that large quantities of it are bought and sold in the seed markets to-day; because when sold at one dollar or more per pound, there may be a gain of three or four hundred per cent. But after what I have written, it is plain that no grower who would make the most of his opportunities should trust to that kind of seed. All my experiences and observations teach me to advise every grower always to

get the best available selected stock-seed from reliable seedsmen. It is the cheapest in the end, by far. The importance—the money value—of having varieties true to kind, and good, strong seed from them, cannot be overestimated. It often makes all the difference between what is loss, and what pays well, in one's crop. It costs more to get it, and we must always expect to pay more for it. After the first cost of the select stock-seed, it costs no more to raise and market the crop than it would if the market gardener grew it from inferior kinds. This latter seed would cost him at least one dollar per pound. An ounce will plant an acre. This amount would cost him six and a quarter cents per acre. If he will add six and a quarter cents more, he can get good seeds of profitable kinds. This would be at the rate of two dollars per pound. If he will add another six and a quarter cents, he can buy choice seed of better varieties; or at the rate of three dollars per pound. But if he will add yet another six and a quarter cents, he can have selected stock-seed from the first kinds in the land. This would be at the rate of four dollars per pound, or twenty-five cents per acre.

It is not always safe to get barely enough seed: for frost, accident, or other enemy, may destroy it. In the North growers usually buy and sow one-quarter pound for an acre, and twice that amount is used in the South. At the above figures the select stock-seed would cost per acre from one to two dollars. This amount is so small that no wise, wide-awake man will risk growing his crops from inferior kinds. The profits from the first

picking off an acre will far more than pay this difference in the cost of seed; and the grower has, for all the rest of the season through, the choicest fruits to place before his customers. Who does not know among market gardeners, that you cannot sell a measure of mixed apples to advantage? Neither can you of tomatoes. Best kinds, in best condition, bring best prices, on all markets, from the best paying customers. After extended observations I am persuaded that there is more lost to the producers of all kinds of field crops by planting inferior seed than from any other one cause. People do not often think about it as it is. In one row of tomatoes forty rods long ONE INFERIOR STALK would, if it had been a good one, so increased the gain of the crop as to have bought select stock-seed for the whole row. This idea was given me by a sharp, shrewd, grower, who was making his business pay him richly. I am well aware that prices, as named above, will seem large to amateur growers; but experienced gardeners will take no exceptions to my reasoning here. It only costs a farmer or beginner a few cents to test the certainty of what I write here by his own experience.

22. Can farmers and market gardeners grow their own seed and save this expense?—I think not, because they plant to *use the fruit*, and not to *get the seed*. It is often to their advantage to plant different kinds side by side. They will cross badly, and so in a few years "*run out*." "But could they not plant some separately and so get their own seed?" Yes, they could,

if they would, and learn the seed-raising business; but will they do it? and would it pay them if they did? Seed-raising is another business altogether, which few market gardeners know anything about. The amount of seed—especially tomato seed—which any one uses is so small, that if he employed the time and labor necessary to save his own seed in producing marketable fruits, he could, by the gain from this, buy selected seed of the best kinds a half dozen times over. An old saying is, "Every man to his trade;" for those who make a business of any specialty can do that cheapest. So it comes to pass in human affairs that most of us find it pays best to do a few things well, and buy what we want cheaper, vastly cheaper, than we could if we tried to produce it for ourselves. Let us "live and let live." See what other writers think on this same subject:

Should Gardeners Grow Their Own Seeds.

BY W. J. GREEN.

"This question is usually answered in the affirmative: the reason assigned being that one can grow better seeds than he can buy. The reason may have been a valid one once, and may still hold good in some cases, but to advise private parties to grow their own garden seeds is about as antiquated advice as to recommend farmers to weave their own cloth.

"Indiscriminate advice is worse than no advice. This is one of the cases where careful discrimination is required. To grow good seed, it is not only necessary to keep varities pure, by preventing crossing, but it is

also necessary to exercise the greatest care in selection of stock. It is not enough to secure a good variety and then keep it from mixing with other varieties, but trueness to type and purity of strain must be looked after. Imperfect forms must be weeded out, and only those that come up to the proper standard retained. The art of selection so as to obtain the best possible results is not so well understood as desirable, but professional seed growers know about all there is known about it. They could give private growers "pointers" every day in the year.

"There is no doubt but they know how to grow, and do grow, better seed than ninety-nine per cent. of private growers are able to do, and they sell their products at prices far below what small quantities can be grown for. The only possible good reason for any one to grow a small quantity of seeds for his own use is, that he thinks them to be much superior to anything that he can buy.

"In most cases such persons deceive themselves in the belief that they have something better than any one else is able to grow. But, says one, "If I have something that I know to be extra fine, will it not pay me to perpetuate it myself, so as to be sure of it?" The answer is, "yes, if you are sure that you can do the work better than any one else, but the chances are ten to one that a regular seed grower can do much better than you can, and do it vastly cheaper."

23. Hints to the American Seed Trade Association.—There have been such mixing of varieties, and of names given to kinds by unscrupulous parties, that great and unnecessary expense has been occasioned. Possibly there has been not a little over-reaching in the race for wealth and distinction. Some course of action ought to be adopted, and lived up to, that would render this sort of thing practically impossible.

I recommend that the Association list all worthy vegetables under the name given it by the introducer, together with his description of the same, and that this be published in a book, called "Vegetable Standard," by the American Seed Trade Association. Also, that hereafter no vegetable shall be added to this list, as a new one, until the originator gives satisfactory proofs that it is a new kind, distinct from all those already listed, worthy a place in this Standard, and of the endorsement of the Association. The American Poultry Association does this with advantage to all. It is an acknowledged fact that deceptions are used in the seed trade: new names are assumed for old varieties by those without principle: they sell thousands of pounds of seed none should buy, and much less plant. Such need exposure before the public, for the benefit of all. I here add, as confirming what I have said, the words of a good writer from one of our Experimental Stations:

"In testing varieties at our station, we have forcibly noticed the confusion that exists in the names of vegetables, and have, many times, strongly felt the need

of some authorized standard that would aid us in determining whether a given variety we are growing is distinct, or whether it is the same as some other, bearing a different name.

"Because we have discovered that there is no such standard, and because we are finding out that many of the names offered in our catalogues are not distinct, it has occurred to us that we can perhaps do no more useful work for horticulture than to make the effort to discover how many distinct varieties we have, and to make a complete and accurate description of each. It is certainly not our province to assign the blame for the confusion of names that exists. Indeed, the more we learn the more we become convinced that it is nobody's fault. It is the natural and inevitable consequence of carrying on the seed business without an authorized standard of varieties. It is what language was before we had a dictionary, and what our fruits would have been to-day, had not Mr. Downing and his associates accomplished the great work of sifting out the synonyms.

"The question has often been raised whether it is possible to make descriptions of varieties of vegetables which will apply to different soils and climates. Our botanist friends have often expressed grave doubts upon the subject, and have even declared it impossible. After three years of study in this direction, I am of the opinion that the thing is practicable, though it is certainly not easy of accomplishment."

Some kind of protection, too, ought to be found for

the right in these matters, and for those who walk uprightly. We cannot have it too soon, either. I have thought that a national law to the effect that no one should SELL THE SEEDS of any vegetable without consent of the discoverer for five years from date of letters patent which the Government had given him for discovering a new and worthy vegetable was a just necessity. If I had had such protection upon my new tomatoes, there is not a seedsman in the land but knows it would have been worth thousands of dollars to me, and would not have been one dollar less advantage to the seed trade of the country, or to those whom they serve. If a man is entitled to seventeen years protection on any new device of every sort, how much more ought the seedsman or grower who discovers a new article of food have protection for five years. I hope some member of the Association, more familiar than I with the details of this business, will work it out and put it through; for it would give a wonderful impetus to the securing of new and useful kinds of vegetables.

Here is another thing in which all seedsmen and their customers are interested. There is an increasing seed trade carried on by mail, and this is largely by the poor of the land who only buy in small amounts. The United States ought not to carry Canadian mail matter at four cents per pound, and charge her own citizens just double that rate, viz., eight cents a pound. I believe if the Association did but call the Government's attention to it, this would be changed at once. England is able to take care of herself, and this country ought to

give her own subjects (among which are seedsmen and growers) a better opportunity to be loyal and thrifty citizens by taking better care of themselves in a legitimate way.

24. Profits on a Tomato Crop.—I now propose to show that this is a profitable crop to raise. After all, if there is no demand for them, good kinds will help no one. If we cannot get a good price for them when they are grown, of what avail will improved varieties be to any one. This is shown in the history of the Golden Queen tomato. My readers have a right to know and be satisfied whether tomato growing is profitable or not. This point must be proven clearly, and I aim to do that here for any fair-minded person.

It is variously and correctly estimated that an acre will produce from one to eight hundred bushels of tomatoes. A man can grow as many acres of them, and be equally as certain of a good crop, as he could be of corn. Indeed, take the soils and seasons as they come and go, he would be rather more certain of a crop. He would now be quite as sure, also, of a ready market for the one as the other. Neither will it cost more labor, time, attention, or money, to produce tomatoes than to raise corn; and they have rather less enemies than any other field crop as extensively grown. Like other products of the soil, the price will vary according to the law of supply and demand. It will range from twenty-five cents to one dollar and a half per bushel. Let us reason a little from these premises. If you harvest one hun-

dred bushels, and sell at twenty-five cents per bushel, you get twenty-five dollars per acre. This is counted at lowest acreage and lowest price per bushel. It will not be better than that with corn, oats, wheat or hay, if you count either of them at lowest acreage and lowest prices. But, if you sell the one hundred bushels per acre at fifty cents per bushel you will get fifty dollars: and if for one dollar per bushel, one hundred dollars per acre.

Now, if you harvest four hundred bushels per acre (one-half the largest possibility), and sell at twenty-five cents per bushel, you get one hundred dollars: at fifty cents per bushel, two hundred dollars: at one dollar per bushel, four hundred dollars to the acre.

These results show up well when compared with those of other crops which growers have been raising, I venture to assert. Do you ask, "but are not these imaginary figures?" I answer, "not a bit of it." This very season—1892—tomatoes were readily sold on the Columbus markets at from forty cents to one dollar and a half per bushel; and we had in our own fields a good many acres that did not fall short of the four hundred bushels to the acre, either.

"But if all farmers went into the business of growing tomatoes, what then?" I am often asked such questions. Every one will not do it; at least for many years to come; and then, when it does not pay longer, it will be time enough to change to some other crop. The above question would apply equally well to any other standard crop of the present time. It could be asked with as much pith and point of the potato, corn,

or wheat crops. But there is no more danger of overstocking the markets with tomatoes than with any other single crop that is commonly raised at this time. To-day Ohio alone needs twenty-five more canning factories to be up with Iowa or Maryland. Southern shippers must make money, for there are thousands of them in the business of raising tomatoes for the northern markets. The selling prices range from two to eight dollars per bushel, and they secure from fifty to two hundred bushels to the acre from the early spring crop, and more per acre from the early summer crops. From the above prices must be subtracted the commissions and freights, but if that costs half its value, their returns will still be from fifty to eight hundred dollars per acre. Information from the experimental stations shows that they could be raised under glass or in hot-houses in the North, and sold at spring or early summer prices with a net profit of fifteen cents per square foot for the plat so planted. There are nine square feet in a yard. This would be a net profit of one dollar and thirty-five cents to the square yard; or in a hot house one hundred feet long, with beds a yard wide on each side of the walk, it would bring two hundred and seventy dollars net gain. And remember, this would come in after other good paying crops had been taken off the same beds—such as lettuce.

And if one grows the tomato for his own use, no fruit, or other vegetable, will afford him such abundance of healthful food for the same expenditure of labor. This will enable my readers to see that there is money

in the business, with no more "drawbacks" than in any other line of products from the soil. Still, if a man has failed in all else, I could not advise him to try growing tomatoes for profit: but I will tell you that the kind of man who will, in my judgment, get the nearest to eight hundred bushels to the acre, and secure the nearest to one dollar per bushel for them. It will be the man who *aims* at these figures, leaving no stone unturned to get them, and working closer to it from year to year as *experience* teaches him what, and what not to do. He will dare to risk whatever reasonably promises to fetch better crops and better prices. The man who selects the best seeds, of the best kinds, for the best soil he has, works it most judiciously, uses wisely the right fertilizers, prepares it best for market, reads the best newspapers, is, with courtesy and honest dealing for all, the man who will succeed in growing good tomatoes and getting big money for them. Give this an all-around, faithful trial, and then write me a letter of thanks for calling your attention to it.

25. Selection of Kinds to Plant.—There are more than three hundred kinds of tomatoes: at least, there are above that number of names applied to them. It is charitable for me to say that each of these kinds have some qualities to recommend them. Many respectable fellow-seedsmen advertise some of these kinds, and all growers who have tried them, and find they pay them better than other kinds, would be very foolish indeed to abandon them. I do not wish to say anything

against any of these particular varieties, nor will I: but the reader will easily believe, as I have discovered and introduced thirteen different kinds, with a view of meeting the demands of the times, that I would at least prefer my own to all others. If I were to collate what the Bulletins *decide*, and the money-making customers *say*, of my tomatoes, in comparison with all other most popular varieties, I could not complain that my judgment in this thing was not ably confirmed. I would gladly avoid naming varieties suited to any given end the grower might wish to attain; and yet, I hope my modesty will not be questioned when I say that I have every reason to think that my readers will want to know which of his kinds Livingston would plant for any given purpose. I will name, then, only those heretofore described in this book.

26. Kinds for Shippers.—As these are earliest on the market, I name them first. For early red, PERFECTION and THE ARISTOCRAT: especially in those parts of the country where "*staking up*" is extensively employed. THE BEAUTY, of purple color, comes next, and should be given place for one-half the whole crop. NEW STONE for bulk of crop between early and late; this is a red tomato, and very choice for this purpose. And PARAGON for red late.

27. Kinds for Home Use.—I would name FAVORITE for early red, and ACME for early purple. BEAUTY for bulk of crop. A few stalks of yellow GOLDEN QUEEN

is needed for slicing and preserves. For ornamental trellising and useful crop, try ROYAL RED, POTATO-LEAF, and yellow GOLD BALL. On fancy trellises they are very beautiful, and will repay the grower for his trouble in good fruits. If a farmer wishes large, fine-fleshed tomatoes, so that he can get a good price on market (should he have more than he wishes for himself), let him try BUCKEYE STATE, which is of purple color, and quite sweet in flavor.

28. Kinds for Market Gardeners.—ACME for first early purple, and PERFECTION for first early red. The purple BEAUTY, and the red NEW STONE, for bulk of crop. For very large ones of purple color, plant BUCKEYE STATE; and for late red, the PARAGON.

29. Kinds for Canners.—They should see to it that their growers plant PERFECTION and FAVORITE for early, the NEW STONE and BEAUTY for medium and bulk of crop, and PARAGON for late. If they wish to get very desirable kinds for canning the fruit whole in bottles, let me commend the red ARISTOCRAT, the purple POTATO-LEAF, and the yellow GOLD BALL. See Paragraph 61.

30. Kinds for Catsups and Preserves. — For catsups, ROYAL RED, and for preserves, GOLD BALL.

31. Kinds to Grow Under Glass.—I recommend for red color, THE PERFECTION and THE ARISTOCRAT; and for purple, THE ACME and THE BEAUTY.

Now, although we thus name these kinds for special purposes, yet the grower may profitably try other kinds if it suits his convenience better to do so. This list is largely intended for beginners, and is to have a general application.

32. Sowing Seed for Family Use.—Make a shallow tray or box two feet long, one foot wide, and six inches deep; or get a goods box from your grocer about the same size; or whatever will fit best into the sunniest window of the warmest room in your house. Take some rich black soil, with enough sand in it to keep it from baking after it is watered, and so it will make it warmer; put it first into the oven and heat it until all the weed seeds and insect life there may be in it will be destroyed, and then put into your box enough of it to fill the tray three-fourths full. Arrange to fix your box on such an incline at the window as to get the sun's rays perpendicularly, or square against the surface of the ground. Moisten this soil and stir in the sun from time to time, for a day or two, until it is in fine condition to make the seed germinate. All this is to be got ready from the middle of February to the middle of March in the latitude of Ohio; north or south of this, vary the time to suit. In this box plant the choicest seeds of the best kinds at your command. Lay it off in rows across the short way of the box, four inches apart, and if you wish to take the trouble, put the seeds about one-quarter inch apart in the row; otherwise sprinkle along, so as to be as near that thick in the row as you

can hit it in that way; then cover with one-half or three-quarters of an inch of earth, and "*firm it down*" on the seed. Care must be taken where two or more kinds are planted in the same box, to mark the rows carefully where they were planted, on the outside of the box, at the end of the rows; otherwise it will be forgotten which is which, by the time they are to be transplanted. Each kind should be set by themselves in the garden, and their names preserved throughout the season; then the grower will know which kinds suit him best, and so can tell what to send for next year. After the seed has been planted a day or two, dip a piece of brown paper or cloth in water, as warm as you would wish to put your hand in, and spread it over the whole surface of the ground. This covering should be remoistened in warm water every day or two, but especial care must be taken to remove it when the little tomato plants begin to "get their backs up" through the soil, which you may expect in a week or ten days after sowing. Stir the surface of the soil between the rows from time to time, and moisten just enough to keep the plants growing nicely, but not enough to force them along. They would better be too dry than too wet. The dryer the warmer, the less liable to rot, or to grow too fast, and be long, slim, weak plants. Keep them from getting stunted, but have them grow as short and stubby as you can get them. Transplanting will effect them less disastrously then when they go out into the world.

When they are two inches high prepare another

similar box to the one used at first, or boxes as may be needed. Make the plants very wet, then raise or pry them out so as to retain as much of the dirt upon the roots as possible, and set them out again in rows two inches apart and two inches from each other in the row. Be sure to keep the different kinds separate, so you will know which from which. When these plants get to crowding each other, or about four or five inches high, pass a sharp knife midway between the plants on each side. This, if you have followed directions carefully, will give you a little plot two inches square to each plant, and this plant will stand exactly in the middle of it. Make them wet as before, and reset three or four inches apart, rowed both ways. If the square plat of dirt is taken with the roots, they will hardly know they were moved. As they grow pass the sharp knife midway between the rows at least once in two weeks, to keep the roots from interlocking, and to hold back the plants from growing too tall. Some extra plants can be set in flower pots if need be, scattered about the house wherever most convenient, and best for them to grow. Aim to raise at least three or four times as many as you need. If you do not need them, your neighbors will want such plants at five or ten cents apiece. But do you say, "This is a great deal of bother?" Well, no; I do not think so. Suppose you take fifty or seventy-five plants over the training I have suggested, the sum total of your labor is not very great, and when the fruits come on weeks before home grown tomatoes are seen on the market, you will have your

rewards in the satisfaction of having what few others will have, and of eating refreshing fruit when you want it most.

As soon as the danger of frosts is past, transplant in the open garden. Let me suggest that, on all warm days before you set the plants in the garden, to open the window, or place them on the porch where the sun is warm; this gets them used to out-door life, but you must not forget for a single time to leave them out, and let the frosts nip them some cold night, or you will awaken in the morning to look upon the result with regrets for such careless loss of labor.

Hardening Tomato Plants.

"What is gained by starting plants early, and by frequent transplanting, can easily be lost again by neglecting to harden the plants off properly before their final transfer to the open ground. In fact, this is the most prolific source of disappointment and failure in getting the crop as early as the fine plants promised.

"The transfer from in-door protection to out-door exposure is always attended with risks, and generally results in a check to plant growth, from which the victims will not recover in weeks. Plants grown in hot beds or greenhouses should always be transferred to cold frames and left entirely without sash protection for a considerable time before they are set out in the open ground.

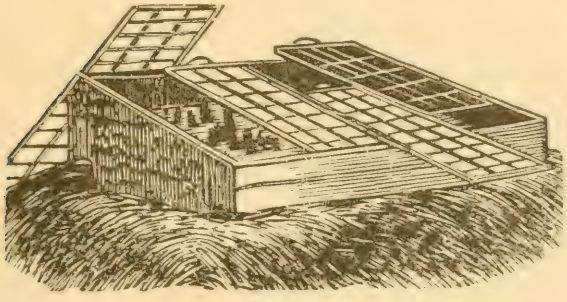
"The wise man always abides his time. Don't let your impatience hurry you and induce you to bed out

plants before the ground has become thoroughly warmed through. The check is not owing to root mutilation or disturbance (as such would be beneficial rather than otherwise), but to change of atmospheric surroundings, soil, temperature, etc. The plant accustomed to hardships by previous exposure will suffer but little by the change."—*Farm and Fireside.*

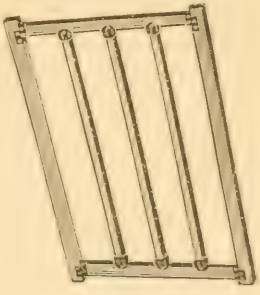
For different methods of cultivation in the garden, see Paragraphs 45 to 49, inclusive. If you do not wish to grow the plants for yourself, reliable seedsmen will furnish them cheaply by express. This is a good way to get good plants, of good kinds, when you need them.

33. Common Hotbeds.—It will be necessary for all who wish to raise more tomatoes than they desire for their own use, to think of it in the fall of the year preceding that when they would raise the crop, in order to make the proper provisions for it. A warm, sunny spot should be chosen, on the south or southeast of buildings or other protection from north or northwest winds. Indeed, if these are not conveniently situated the grower should build a tight board fence eight or ten feet high, on the north and west sides of the place where he wishes to locate his hotbeds. These ought to be put as close to this fence as possible, and leave room to walk around between the fence and the beds. One thing must not be overlooked in the choice of a site for a hotbed, viz.: If the subsoil is porous it will not need drainage, but if it holds water the hotbed must be located so as to underdrain with ordinary three-inch tiles.

The best way to make these beds is to excavate the soil, with their length running east and west, for a depth of two feet, in the fall before frosts harden the ground. Drive a stout stake 2x2 or 2x3 inches carefully in each of the corners. Nail to these, on the outside, boards so the bed will be eighteen inches high on the north side and six inches high on the south side, and slope the ends to meet the sides so enclosing it. Bank up the north side and the ends with the dirt thrown out. If you buy



HOTBED.



HOTBED SASH.

sash expressly for the purpose (which you can of almost any first-class seedsman), it ought to be three feet by six feet in size, as this is probably the most convenient. Of course any kind of sash can be used, but in any case the size of the hotbed must be made to fit the sash used over it; and any size of hotbed can be made as desired, but almost the universal practice is to make them about six feet wide, and as long as will secure as many square feet of hotbed space as is needed.

Now we have the hole dug out, boarded around, and the earth banked up to it, and this done in the fall preceding; but you are not through with it yet. Put

into the bottom of it enough good black, or rich tan-colored soil (having sand in it to loosen and make it warm) to fill it seven inches deep. On this throw in and "firm down" enough fresh manure from the stable to keep this good soil and the inside of the hotbed from freezing until it is needed, about the middle of February or first of March. On some sunny day when this time arrives, remove this manure, piling it out on all sides except on the south side; also take out the good soil, placing it on the south side of the bed, exercising care to pulverize it as fine as possible in the handling of it. Now put into this vacant bed eighteen inches of fresh manure from the stable, that which will produce the greatest heat, and tramp it down tightly, and make it as level on the surface as you can. If the manure is too dry to heat, make it wet with hot water. Spread on top of this manure the rich soil six inches deep. To get it evenly spread, you must put on the whole six inches *as you go*. If you put two inches on, and then some more, and then more, you will get it in uneven thicknesses and it will not work so well. Now place the glass over it, and, in a day or two, as soon as it gets warm and dry, it is ready for the seed.

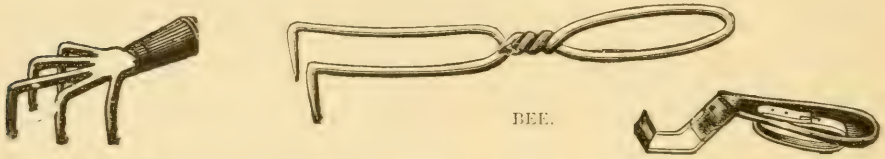
34. Sowing Seed in the Hotbed.—Make little furrows on the surface of the bed, one inch deep and three inches apart. This will make the entire surface into little ridges and hollows. Sow your seed broadcast upon the bed thus prepared, so it will contain about two hundred and fifty seeds to the square foot. Then take

your garden rake, turn it teeth upwards, and with the back of it on the surface, lightly and diagonally draw it over the ridges until it is all level again. Nearly all the plants will then come up in rows. This plan saves much time and many back aches. The soil should be "*firmed down*" on the seed as soon as you have it in the ground. This is done conveniently with a board of suitable size, and your weight put on it; or with a small, heavy hand roller. When small quantities of various kinds are sown, the ordinary method of sowing a row at a time should be observed. Be sure to mark carefully where you have planted this kind or that, so that you can know what you are planting out later in the season. Do not depend on memory; mark it, so you will *know*. Care must be taken now to keep the hotbed the right temperature. It will be advisable for beginners to use a thermometer, although persons of experience can tell by merely putting their hand under the sash. If it gets above 90° F. it is too hot, or below 50° F. it is too cold. A range from sixty to eighty degrees will be right. If the bed gets too hot, raise the sash, and equalize the heat by letting in the outside air; but if this does not cool the soil, and it is still too hot for the plants, then, about each square yard, push down into the manure below, a stick like a broom-handle, remove carefully, and pour in a bucketfull of cold water to each hole. And, likewise, if the manure does not make it hot enough, pour into such holes hot water instead of cold. The heat may be increased, after the seed is planted, by removing the manure and some soil from about the out-

side of the beds, and packing them all around with fresh, hot manure from the stable.

You may expect the seed to come up in eight or ten days. Keep all weeds out: stir the soil with a weeder

WEEDERS.

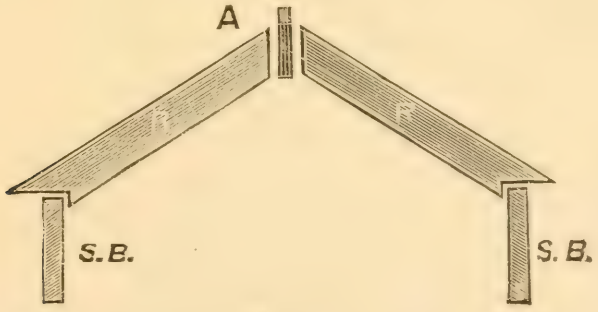


EXCELSIOR. BEE. LANGS.

once a week, and keep only wet enough to make plants grow well, but not so as to force them, or you will get long, slim plants where you need stalky, short, thick, stout ones. Keep the sash open as much as is prudent on warm days, whether the sun shines, or it is raining. It makes the plants healthier and accustoms them more certainly to the conditions of the out-door life they must lead a little later on.

35. More Extended Hotbeds.—These may also be necessary where it is desirable to go into the business of raising plants for market, or where the grower wishes more permanent arrangements than the common hotbeds; or where he wishes to raise, as in the hothouse, other crops under glass before he needs to plant the seeds for tomatoes. These may be made more or less costly, as opportunity and means, or taste, may show to be wise. The site should be chosen in a place with good drainage, protected on the north and west, and having the sun shining upon it all day long. The length of the building should run, not east and west like the common

hotbed, but north and south like the hothouse. They may be constructed of quarry stone, second-hand brick, or of any lumber at hand and which may be suitable for the purpose. Excavate to the depth of two or two and a half feet, and seven feet wide, and to any length to give the desired amount of surface. Wall up the sides to four inches above the surface of the ground on each side, and each end to a point, in the center, corresponding to the comb of the house. For rafters use strips of some good hard wood three inches wide and one inch thick, and a little longer than the sash to be used; and it should be, say, three by four feet; then each rafter would be four feet and three inches long. These rafters should be cut in the ordinary way, only to go up edgewise thus,



r. r.—Rafters, which are exactly equal in size.
s. b.—A section of the side-boards, an end view, on which the rafters rest for a plate.

Enough of the rafter should extend above the side-boards to be a little above the sash, which is also to rest on the side-board at the lower ends, and constitute a main part of the roof. Between the rafters at the top is to be nailed in a strip one inch square (see cut as at

a), and long enough to reach two inches above the tip-top point of the comb. This two inches is to be whittled to a three-quarters inch round. Upon them is to be dropped a strip three inches wide and one thick, having holes bored to suit, to act as a ridgepole. A set of these rafters is to go at each end, and a pair between each pair of sash, which comb upon each other at the top, just under the ridgeboard, while the lower ends lie on the upper edge of the side-boards. To adjust the sash, drive a stiff wire nail with a flat, thin head, through the rafter into the side of the sash, about eighteen inches from the top, on each side of it. This makes a perfect hinge. Then the next pair are fastened in, say, nineteen inches from the top, in the same way; and your building is complete. There ought to be a little slide door, or ventilator, in each end. When the grower wishes to work in this hotbed, by having a stick about a yard long, and loosely hinged with a staple at the bottom end of sash, he can quickly adjust it at any angle desired. If he bores holes in it, and in the rafters to correspond, he can, with a pin, set the sash perpendicularly, or at any angle, in order to let in a warm spring shower so as to save much labor in watering his plants. He can thus regulate the temperature of this house also. One advantage over the common hotbed is that you can work it from each side, and never have to handle the sash except to raise and lower them.

Prepare for these hotbeds and plant in them the same as already described in Paragraphs 32 and 33. In these houses crops of lettuce, radishes, cucumbers, or

other things could be grown before needed for tomatoes. If desired for winter crops, especially of tomatoes, by lengthening the sash, excavating in the earth deeper, and introducing artificial heat, a profitable hothouse can be very cheaply constructed in this way.

36. A Circular Hothouse.—I have never tried it, but I have often thought about a Circular Hothouse, which seemed to me might be very profitable, where a man had the material at hand and could do most of the work himself in building it. Locate the house on a warm southern slope, with an incline of thirty degrees to the east. Excavate on the upper side, throwing the earth down hill, sufficient to secure a circular level place thirty feet in diameter. Excavate still deeper for a furnace below the level, in the center of this plat, and wall up to the surface; also wall up a way out to the south on a level with the furnace room floor. Directly over the furnace construct a hothouse bed in a circle with a diameter of eight feet. Around this conduct a walk of two feet in width, and around this again, construct plant beds seven feet in width; and then another walk of two feet all around this. Cover the whole with glass and sash; and also near the sides with glazed sash three feet by three feet. The entrance to it must be from the entry to furnace room, by a stair leading up under the seven-foot bed, in opposite directions, to the walks. If it can be located below a spring of water, the water needed can be conducted through the building by pipes, and be most convenient. This house will, no

doubt, cost more to construct than one in the form of a rectangle with square corners; and yet the advantages of heating, watering, and working this one would pay well for it.

37. Cold Frames.—These are made like common hotbeds (see Paragraph 33), only not so deep nor having so much manure—ten inches is enough—in them under the soil, so it is not necessary to dig out so deep for them: these are covered with glass, or what is much cheaper and more easily handled, they may be covered with hotbed oiled cloth, or "Plant Bed Cloth," as seeds-

PLANT BED CLOTH.

men call it. By tacking it to light frames, three feet wide by six feet long, they can be used most handily. These cold frames are for receiving the plants when the grower first transplants them from the hotbeds, or resets them again to keep them "stalky." It also gives them more room to grow, and as it is not so warm, the plants are got a little hardier for out-door life when the frosts come on no more.

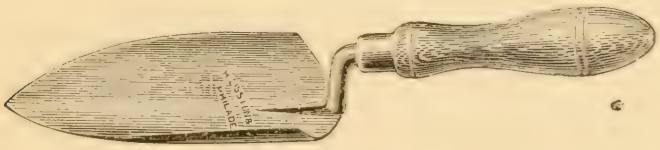
The plants should be lifted out with a garden trowel, put into a shallow tray, and "*pricked out*" with a dibble, or angle transplanting trowel, into the cold frame as described in Paragraph 32. They should be set three or four inches apart, and rowed straight both ways. They

grow well, and work easily this way with the hand weeder (see cut). This makes it possible, also, to prune the roots by passing a knife midway between the plants, each way of the rows, about once a week, with the re-

CLEVES ANGLE TRANSPLANTING TROWEL.

DIBBLE.

sult of keeping the plants short and stout. It is an advantage, too, when the final transplanting comes, as you can take this earthen cube of three or four inches dimensions along with the plant, and it will hardly recognize that it has gone "out into the world," and can now make the most of itself without any great hindrance in "getting started in life."



GARDEN TROWEL.

I wish to remark here, that whoever labors at this kind of work should constantly study what conditions are best for his plants throughout all the changes they must make; and also, how he can most cheaply and conveniently afford them these good conditions. In one

sentence, study to do the best things easiest; for labor, time, or expense, saved habitually, is almost equivalent to cash in hand.

For Southern growers, I want to make a suggestion in regard to Cold Frames: only for them they should be called Heat Frames: for as the former is against cold in the North, so in the South could they be used against heat. Especially would this advantage appear in raising an early crop in winter. Locate this Frame in a somewhat shaded, cool place. If the natural shade cannot be found, then make it artificially of lumber, brush, cloth, or anything at hand. No manure is needed; just level off the place, drive the stakes, nail up the boards, bank up the dirt to the boards, and cover with "Plant-bed Cloth." Put in good soil in which to sow the seed, and plant it in July or August. Open at night, but cover in the day-time. If it is very hot weather, and liable to burn them, saturate the soil all around the bed with cold water. In this way an earlier winter crop can be grown; for now Southern growers must wait till the weather is cool enough "out o' doors" to grow their plants, and so lose much good trade they could by these means otherwise attain.

For Canners, or those who grow for them, no hot bed is needed, only these Cold Frames for earliest, as one transplanting will answer. Large growers find time only for this or resetting. They plant enough later so that the weather is not cold enough to demand more heat than these afford. Indeed, many of these growers sow the seed in drills in the open field, in rich soil, about

the middle of April, and reset from these rows in the field. The risk is too great. It would pay better to build and use the Cold Frames. The latest crop might be risked this way, by planting the first of May. The Cold-Frames are an advantage because they are the means by which plants acquire age without growing tall and spindling, and so bear earlier after they are set out in the field, and are less stunted by the transfer. The importance of "stalky" plants cannot be over-estimated. However, if your plants do get too tall and slender by the time you dare risk them "out o' doors," do not throw them away, but do one of two things: either pull them and "*heel them in*," as fruit men say of trees—that is, put them in bunches of twenty-five or fifty, and cover the roots in the ground; water well, and when it is well soaked away cover plants with dry earth pretty well up on the stalks. Or you can let them grow and then transplant, by letting the stalk lie along in the furrow, covering it with about the same depth of earth as commonly sets a plant, and leaving only so much of the top above ground as can "hold up its head." It will not do to set them deep in the ground, as they will rot off; but as above, it is an advantage, because at the joints roots will grow out and feed the plant more than common, and force it faster than otherwise. Indeed, some growers urge this as the best way to get an early and productive crop.

Cold Frames for an acre, with plants set as directed above, viz.: three inches each way from each other, would require to be thirty feet long by six feet wide, or its equivalent in shorter beds. To put it in round num-

bers, an ounce of tomato seed has twenty-five hundred seeds; by this you can calculate how much seed you will want, and how much hotbed space it will take to grow your plants. Never depend on just barely enough to go around. No telling what may happen. Calculate for abundance of plants.

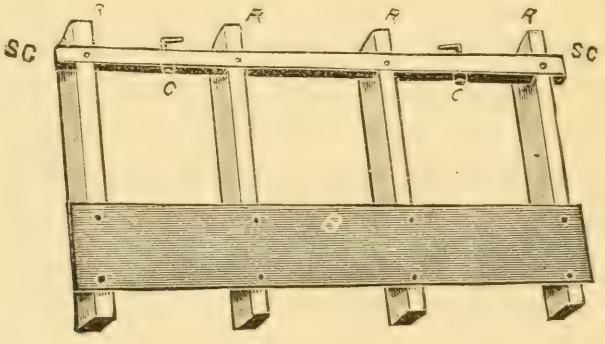
38. Preparation of Soil in the Field for the Plants.—Tomatoes can be grown wherever corn could be planted. Crops will vary also in proportion to the productiveness of the soil. Select a field of sandy black loam or rich tan-colored clayey soil. To get the best fruits, land that is rich enough to fetch fifty to seventy-five bushels of corn to the acre should be chosen. Plow under a clover sod in the fall, or if possible in February, so it will get a good freeze or two. If the clover sod cannot be had, then take the next best field, viz.: the second crop after clover. I prefer for tomatoes to improve the land by "clovering" above all other kinds of fertilizers. Next to clover I use *well-rotted* stable manure. In order to get it well rotted I pitch it over in the early spring, at least once a month. By piling it over itself two or three times it will not burn itself out by its own heat and be almost useless, nor yet will it leach out with rains falling on it. For any crop where stable manure is used, this is a most important point. It can not be out of place here to say, no man can afford to go from year to year without a large saucer-shaped space, with one side of it near his barn, where he throws out his manures, so that as it heaps up he can pile it over,

and so on, to the other side, when he will have a heap of compost which would delight the eye of any man intelligent enough to know its commercial value. This shallow basin ought to be three times as large as necessary to hold the manure, and cemented, or have clay that will hold water well pounded in all over the bottom of it.

If the grower fertilizes with this for a tomato crop, let him spread on broadcast over his land a heavy coat—from one to four inches—and plow it under in the spring. If the land was plowed in the fall, no matter, plow again. No crop is hurt by thorough plowing and plenty of pulverizing before the plants are set in the ground. Of course commercial fertilizers can be used to advantage, but it can be applied best when transplanting or growing, and they will be described in place. In a word, whatever will thoroughly prepare a rich field in good shape for any common crop, will be all right for tomatoes.

39. The Marker.—When it comes time to put the plants into the open field you will be in a hurry, and you will find it very advisable to prepare for it previously, during any leisure time you may have in the winter. A Marker will be needed, and I here submit a plan for one, which I used for a good many years. It is made like a sled with plank runners, only it has four runners instead of two, and they are thicker and shorter than usual for sleds, and set four feet apart—"r" is the runner, made of pine or other lumber. They should be three feet long, six inches wide, and three inches thick. "Sc" is a scantling, two by four inches, and a little over

twelve feet long. It should set into the upper edge of the runners, about three inches back from the front end, to the depth of one or one and a half inches, and be spiked down firmly. On the rear ends nail a strong board, one inch thick and fourteen wide, having same length as scantling (see "B" in cut). Any blacksmith can make hinges or clips, as at "c" "c" in cut, to receive a tongue for hitching a team to it. A good way to do is to find some tongue or "pole" belonging to an old spring wagon no longer used, then it can be left in all



MARKER.

the time, and the marker is always ready the year around. It is not an unhandy conveyance to have around anyhow, as it can be used for many things, such as moving plows, harrows, and even stones or other rubbish, wherever desired. The driver, when using it for a marker, usually stands on the broad board, and drives across the field, and by using stakes secures straight rows.

Now, from the tenth to the twentieth of May, or after you are satisfied that danger from frosts and real cold nights are past, and having your ground well plowed and harrowed, take the marker, and driving to stakes

set in the ordinary way, make rows as straight as possible across the field. This will give four rows "*at a through*," and so mark out your ground pretty rapidly. By using a shovel plow, or similar implement, draw furrows across these markings from two feet to seven, as may be needed. For Dwarf Champion, Aristocrat, any tree-like kinds, or any variety for training or stalking up, from two to three feet will be wide enough to furrow out the ground. Acme and Potato Leaf may be furrowed from three to four feet apart, while all other varieties for "down-culture" will need to be placed from four to seven feet apart. The kind, the tendency to vine, and the strength of the soil, must decide how far plants should be set apart. One thing is certain, there is far more danger of getting them too close than too far from each other in the field. It looks like a great waste of land to set plants seven feet apart, but it will pay to do it on rich soil, and for the best kinds. If the tops interlap or overlap each other, much injury is done the crop. When in New Jersey and Delaware among the canners this last fall, 1892, I found that their Paragon Tomatoes (noted everywhere for its adaptability for a late crop) were all intertwined and overlapped, and I feel sure it was the cause of a complaint that the tomatoes were small on the "last pickings." No one expects to get six stalks of good corn in each hill; neither should he if he plants two stalks of tomatoes where only one should be. Some growers plant "First in Market Peas," or other quickly maturing crop, between the rows, and so save something of this apparent waste of land. Let

me suggest, also, that the grower do not mark off more ground than he can set out while it is still fresh and moist in the furrows. If they get rained on and dried hard in the sun, run the shovel plow through again in the furrow. It will do no harm, if your ground is a little hard or cloddy, to run a second time in each furrow anyhow. It affords more fine dirt for transplanting. If you wish to use commercial fertilizers, secure and have ready in the field at this juncture, put into the crossing of your marking out about a gill, and hoe it in a little with a common hoe. A complete fertilizer for a tomato crop, to be sowed broadcast and harrowed in, is as follows: Dried ground fish, 833 lbs.; dissolved bone black, 210 lbs.; muriate of potash, 150 lbs. Stated in per cents, it would be: Nitrogen 5, phosphoric acid 10, potash 8. A 1,000 lbs. per acre will be needed. It should be put on the day before the plants are set in the ground. In general, fertilizers mostly nitrogen and potash seem best suited for the tomato. On rich soils, use less nitrogen and more potash, as a rule. From Semper's "Manures," on pages 149 and 150, I quote the following fertilizers for tomatoes per acre:

No. 1.	Nitrate of soda,	200 lbs.
	Dried blood,	100 "
	Cotton seed meal,	300 "
	Dissolved bone-black,	400 "
	Dissolved South Carolina rock,	400 "
	Muriate of Potash,	100 "

GEORGIA EXPERIMENTAL STATION.

No. 2.	Nitrate of soda,	400 lbs.
	Superphosphate,	800 "
	Muriate of potash,	200 "

Every grower ought to try different plant-foods for his crops till he learns what is best for his fields; but almost anywhere he may well try a gill of hard wood ashes to each plant, with good hope of increased harvests. Let me urge the grower to be thorough in all that he does. Do not be afraid of work. A little boy once said to his father:

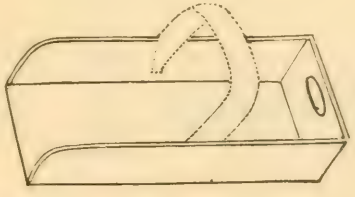
"I know what makes these onions grow so well."

"Why, my son?"

"Because you have to get down on your knees so much to them."

The secret of successful gardening consists in attending diligently to your crop WHEN IT NEEDS IT.

40. Transplanting Into the Open Field.—Turn back to Paragraph 32 and read it over. During the winter previous make a "Handy Tray" for carrying plants. It is made of one-half inch lumber. It should be two



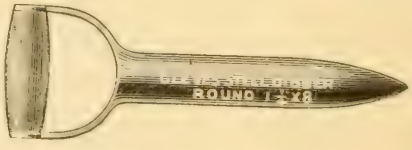
HANDY TRAY.

feet long, sixteen inches wide, and four deep. One end should be left out. In the other end a suitable hole is cut, so the hand can slip into it, for a handle, while the open end is caught by the bottom, and so is easily carried. Sometimes a strong wooden hoop is bended over in the

middle from side to side, and makes a basket-like handle. A shallow goods box (made over a little) will answer very well. If each hand setting out plants carries a tray with him, then the handle is a disadvantage, for he drags his tray full of plants along the ground, and sets as he goes. If one drops plants and another sets them out, then the handle is an advantage, for he can carry it with one hand and drop with the other.

An hour or two before beginning the work of transplanting, or about one or two o'clock P. M., pass the knife between the plants midway between the rows each way, at least four inches deep; then wet the plants thoroughly and let the water soak into the ground for one or two hours. During this time enough furrowing out for that evening can be done. Then take trays enough to hold all the plants to be wet that evening. You will need a small mason's trowel, or better, "Cleaves' Steel Dibber," flat blade, two and a half inches by nine, having a spade-like handle.

FLAT BLADE DIBBER.



CLEVES ROUND DIBBER.

By using this in the cold frame, the three or four inch cubes of soil with a plant in its center can be taken out, one by one, and slipped off into the tray. Elevate the open end of the tray a little, and commencing at the closed end of it, pack in the plants till it is full. Care should be taken not to crush the soil from

the roots in handling them. As each tray is filled place in the wagon, and when sufficient number is obtained all hands are away to the field.

A careful way here is for each hand to take a tray, and following a row, slip the plants out into the furrow at the crossings, keeping them upright and as much soil about the rootlets as possible. When in place, press some fine soil around the plant with the hand, so it will stand firmly. It will not come amiss then to water each plant (about a pint to the plant), and the next morning go along with the hoe and hill up the dirt to it. It will hardly know it is moved in this way, if they have been "hardened off" well (see Paragraph 32), and this will add to the earliness of your "earliest of all" at least a week. Have a care, also, if you take different kinds in your trays, or in the same wagon-load, not to get them mixed up in setting them out.

Let me put in a warning against the use of "volunteer plants," or such as come up of their own accord in the spring on soil planted to tomatoes the year before. They cannot be depended on as true to kind, not even if the best of selected stock seed was used the year previous. My crop was once destroyed by cut-worms, and I used some volunteer plants and had seed that produced all sorts. I am often asked: "Why will not 'volunteers' come true to kind?" I am not able fully to answer this question, but I have a theory which may help some one else to study it out. It seems strange that it is so; indeed, it appears impossible, yet I know it is true. It is worst in the South—in Florida, Mississippi, and else-

where—where frosts do not kill them out during the winter. Things left to themselves get wild, degenerate, "run out." Without coddling or nursing under the most favorable circumstances for their growth, they keep only the most hardy qualities, while the best and tenderest parts retain only enough of themselves to sustain life—that is, these parts run down to the lowest range of limit and live. Hence the difference between a wild native tomato and one of my improved smooth varieties. I have no question but the best tomato on the markets to-day, if left to itself for eight or ten years, would "run out" or degenerate to the lowest point of its limitations; but that same tomato, if not crossed with other kinds, could be brought up again (by observing to put it under right conditions) to the highest point of excellence within its limitations. Hence it will be seen that the stock-seed grower must be one who understands how to "*keep up*" their excellencies, if the fruit-growers get what they desire, and ought to have, from year to year. Another reason lies in the fact, that if this is any kind of tomato which has any original wild mixed blood in it, lying out all winter is calculated to furnish the conditions for its development; and hence it appears, while under the better or higher cultivation, such things would continue latent, and might not be seen for years.

Coming back from this digression about "volunteers" to the matter of Transplanting again, another way of handling the plants for field culture, especially for large acreages, when so great care cannot be taken for want of time, and because of expense of extra help,

is to let one hand take the tray on his arm and drop one plant in each hill, with the tops all one way; then another can follow up, coming to the plant against its top instead of its roots, and with his "Cleaves' Dibber" (or similar implement) make a slanting hole in the soil in the Rill, and lifting it, slip the tomato root in and let the dirt fall back on the plant, giving it a little firming down with his foot as he passes on. With practice, boys sixteen to twenty years old get to be experts in the use of the dibber. Afterwards apply the water, and hoe up the next morning, as before described. In this way plants can be set out until the first of July for a general crop. Sometimes, if desirable, the seed can be planted

SOWING SEED.

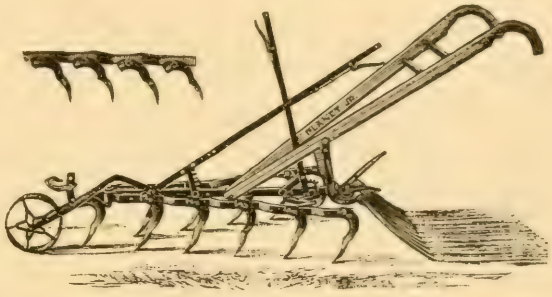
in rows in some rich, waste soil in the open field, from 1st of May to the 15th of same month. To transplant these, wet the rows thoroughly two hours before pulling them; pull, and set as described before in this paragraph, but *always* put the water to them and hoe in the dry soil

after the water soaks away. Not many plants will be lost this way, but they will be stunted a little, and so will not bear fruit so early after transplanting as plants raised in hotbeds and brought up in the cold-frames. It is never necessary to wait for wet weather in order to transplant successfully. Plenty of water used in taking the plants up, and also in setting out again, insures a good supply of rootlets and good mingling of them in the ground again. If this is followed with the hoe or suitable cultivation almost at once, the results are more satisfactory than when one works in soil that is too wet, for then the soil is apt to bake, and sometimes hardens around a stalk and fairly girdles it.

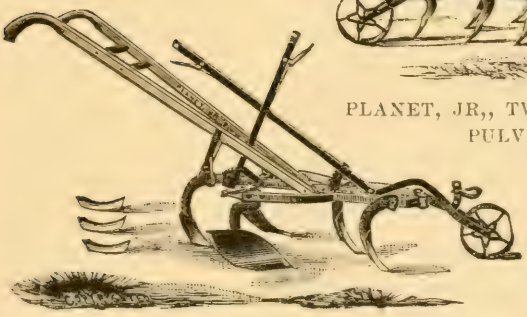
Do not get nervous, and put your plants out too early. Nothing is gained by it. Cold rains, cold nights, danger of frosts, and shady days, injure them and destroy many plants. Wait till you feel you will have warm, growing weather, then stick them in. I have waited till the first of June for early here, and then came into market before others who had set out two or three weeks ahead of me. A good way to tell when it is safe to risk transplanting in the field, is to watch the buds on the oak trees, and when the leaves are like a squirrel's foot the time has come for first early to be set out in the field.

41. Implements for Cultivation.—These may be any ordinary implements for cultivating the soil, such as one has at hand and employs in other crops: but whatever is to be used should be on the ground, for cultiva-

tion must begin at once after the transplanting is finished in the field. The Planet, Jr., implements are, all in all, the best in the market, and can be bought of seedsmen everywhere. The Planet, Jr., Horse Hoe and the Planet, Jr., One-Horse Harrow, for surface and level cultivation, are A No. 1.



PLANET, JR,, TWELVE-TOOTH HARROW, WITH PULVERIZER ATTACHED.

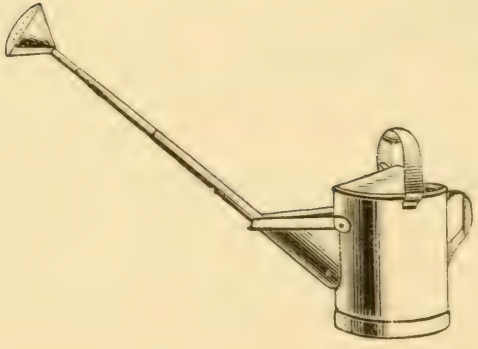


PLANET, JR., HORSE HOE AND CULTIVATOR COMBINED.

42. Cultivation of Field Crop.—Tomatoes need culture as soon after transplanting as possible, and after that about once a week till the vines fall down and make further cultivation impracticable. But even then, if the season has been such as to allow big weeds to show themselves above the plants, go through after a heavy shower and pull them out by hand. The fine steel-toothed one-horse harrow is best for level and first cultivation. The Planet, Jr., Cultivator will answer for second and third cultivation. If marked out to sow

both ways of the field, and if at all convenient, work the crop both ways alternately. Great care must be taken not to disturb the roots after the plants fall down or are in bloom. Very shallow culture is best after the plants begin to spread out over the field. The same general matters of importance in the culture of any crop apply to raising tomatoes in their "down-cultivation" in the open field.

Work them well, keep the ground clear of weeds, give them room to "*spread themselves*," and the grower will not need to complain of results.



Other methods, more or less practical to some of my readers, deserve mention and description here. According to circumstances or desires of the growers, they have been employed to greater or less advantage. These are Staking up and Trellising in various ways, which are increasingly popular from season to season.

43. Mulching Tomatoes. — For down-culture, there may be added to the above methods of ordinary cultivation that of mulching the ground quite heavily under the vines with straw. This is especially desirable for a dry, sunny hillside location or for dry seasons, or in any kind of light soil that spatters up badly on the fruit, or in very weedy, foul ground. This is only practicable when one has the straw and not too large an acreage to cover. It is especially desirable to turn the vines a little along the rows, and, it may be, to trim the tops that seek to drop over to their neighbor's rows, so as to leave a comfortable and convenient walk between them to gather the fruit. Land is not generally so scarce as yet in America that we cannot afford to give our tomatoes plenty of room to grow all they want to, and so do us better service all around. Try some tomatoes with this straw mulch, and see how it works for you. If the season turns out wet, then draw the straw away from the roots and leave between the rows.

44. Pruning on Down-Culture. — If a grower has the time and working force to do it, there is real, substantial gain to pass along the rows, and when the

side-shoots begin to appear select, say four, of the most vigorous and let these only grow—cut off all the rest. If you cut them off as fast as they get to be an inch or two long, you will get the best results out of the trimming. You will need to pass over them several times to get it best done, but you will like it in improved quality of fruits gained. Some also advocate cutting the ends of vines off after the tenth of September. This can be done as conveniently with a common hand corn-knife as anything else, and may be worth a trial, although I cannot speak from any definite experiences of my own.

45. Staking up Tomatoes.—For a considerable crop, this method is being tried more and more, and the evidence of experience is in favor of it, where it can be done at all. In some of the Southern States their field crop is raised in this way. It is a most advantageous method for farmers, village, or city gardeners. The stakes may be poles of two or three inches growth and six to eight feet long, or sawed lumber of one inch thick by two or three wide, and the same length as above. These should be got ready during leisure time, the winter previous. After the second cultivation in the open field, or when the plants are twelve or fifteen inches high, just before they fall down and begin to spread out, put the stakes in the front end of a wagon or sled—not more than one-half a load. A wide-awake boy can drive the team straddle of the second row in the field. Two men, with an ax apiece, can set and drive them, one in the first and the other in the third row on each side of the

conveyance, and by taking every other one they can also place a stake in the row at the rear of the vehicle. They can do this without getting out, and so set three rows "at a through," and with good speed. These stakes should, of course, be sharpened beforehand, and when left should stand quite firmly in the ground.

Another method of fixing these stakes in place, is to take a reasonably heavy crowbar of iron, having a sharp point and a swell above it to make a hole about same size as the stake to be set. By raising it up and forcing it into the ground a few times in the same place, a hole of sufficient size and depth will be made, so that when the stake is thrust into it solidly, and the earth tramped firmly about the surface with the feet, it will stand ready for service. An ax or sledge can also be used to drive a short stake with a ring of iron around the top to keep it from splitting, and when removed carefully the tall stake can be set in the hole, as described above. If any one has other methods which are handier for them, they will answer. The point to be attained is to get a stake from four to six feet above ground, which is strong enough, and set firm enough, to hold up a tomato vine in full bearing, and to get this ready and in the hill by the time the plant is ready to topple over on the ground.

46. Tying up to the stake is done by using some soft twine, jute, or raffia, which can be bought of seedsmen at a few cents a pound, although any kind of string will answer if not so fine and hard as to cut the plant.

With this tie *loosely* around the plant and *tightly* around the stake one foot from the ground; again tie at two feet high, and another at three feet, and another at four, and, if necessary, another at five; but the last tying should be made firm to the plant, because the heavy fruit must be sustained; yet this last tying should also be above where the fruit "*sets*" on the vines. Here let me say, that some of the objects of "staking up" are to get larger, cleaner, smoother, better flavored fruits, and especially an earlier, and a larger number of choice, marketable fruits to the vine. Many, therefore, when about five to eight clusters have set on each stalk, do not let more grow on it, but while pruning trim them off, and throw the strength of the vine into these clusters. They claim that this brings quicker and more "earliest of all" than ordinary culture. This necessitates "Pruning," which we will describe in the next paragraph.

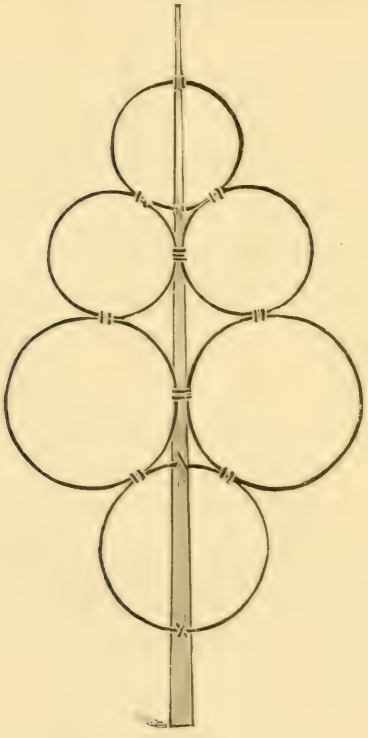
Another method of "tying up," especially if you have flat stakes, is to take a piece of braid, or a strip of cloth or leather, three-quarters inch wide and four to six inches long. Give it one turn around the plant, and drive a tack through the two ends lapped over each other and into the stake, at each foot of its growth. If two shoots are allowed to grow, tack on opposite sides of the stake, so as to fasten a shoot on each side. Here again anything will answer that holds the plant up to the stake and does not injure the growth of the vine. I might say, for Western men who will likely want to use pine board stakes, dip the part of the stake that goes into the ground, and a foot more of it, into hot,

strong brine, having a pint of tar to every two gallons of brine, put into it when hot. It will help, too, to put into it a little crude carbolic acid, also a little cheap oily matter, like crude petroleum. This is a cheap decoction which will go a long way, and pay well in preserving your stakes. Stakes should be piled up in a dry shed when not in use.

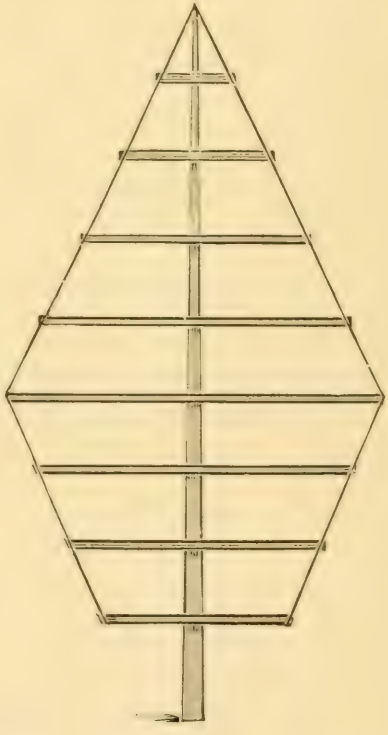
Another thing, if only a few clusters are allowed to grow on a vine, then a succession of plants should be set every two weeks until the fourth of July, so as to have others coming on after these all ripen. The last set out will be in the first flush for ripening about the time frosts come, so that quite a goodly lot can be held to ripen in a dry, sunny cellar, or shed which is frost-proof, and will sell to advantage.

All kinds of fancy "*staking up*" for beauty or profit will afford pleasure for those who have a taste for such crops, and pay well. If one wishes to see how much fruit he can make a single stalk bear, and have for his labor something that will attract his neighbor's attention as he passes by, let him, for each plant, dig a hole not less than two and a half feet square and two deep. Fill it with rich soil mixed in equal parts with thoroughly well-rotted manure. As this compost is put in, "*firm* it" around a strong post to stand six or eight feet out of the ground, and nail to it any arrangements of bars, straight or curved, or hoops in any shape or form to suit the grower's fancy, and then train by tying up a good supply of the strongest branches, as before described. By nailing strong wooden hoops, such as are found on

sugar barrels, about two feet in diameter, to the two opposite sides of the post, as shown in the illustration, a "tree-tomato" can be made which will delight the eyes of all who see it. For the top and bottom hoops, cut into the side of post about one-quarter of an inch, then



HOOP.



DIAMOND.

by cutting them in two they can be toe-nailed into the post and so fastened firmly, and also match the others. The vines should follow the hoops and leave the clusters open, also let them cross where the hoops touch. The smaller hoops are made by cutting apart and overlapping. The fancy grower may, if he prefers, have something

very pretty by nailing hard-wood plastering lath, or similar strips of any kind of wood, in such lengths as to make a diamond form. Two strong fence wires should pass and be stapled around the outer ends of the cleats, as near an inch apart as may be. Train the shoots out on these like a grape-vine, and keep well trimmed. Many other forms might be given and used—in fact, anything desired.

47. Training or Pruning Tomatoes.—Within a few days after, or at the time of first tying up to the stakes or trellis, pass along the rows, select one, or two at most, of the thriftiest and most promising shoots on the vine and let these grow. Pinch or cut all the other sprouts off, and do this as often as is necessary, to keep the whole strength of the plant growing into these shoots. It will be needed about once a week. Some growing on rich ground trim off a portion of the leaves, keeping only enough to shade duly the fruits from the hot, scorching suns which occur after summer showers.

A successful grower, of twenty-three years experience, gives his methods as follows: "I have a garden spot fifty by sixty-four feet in size; but from it I furnish my family of ten, with all the vegetables they need; and sell from $25 to $30 worth off surplus. Tomatoes are my hobby, and I have the reputation of raising the finest in the market. I gained this by using your kinds, and the methods I here describe of cultivating them: I first prepare my ground by removing the soil for several feet, put into the trench two feet of manure well tramped

down, then six inches of soil, and then eight inches of well-rotted manure, and soil again till I reach the surface. In such a soil, cut-worms and grubs bred, and cut off a great deal I planted. Angle worms honeycombed this soil so that it dried out like an ash heap, as the dry weather came on; and tomato worms added their work of destruction on the tender growths I thus secured. Experience had taught me however, that tomatoes love a rich soil; so I worked to keep this, and still get rid of the pests, and I have succeeded. For two years I have not lost a plant by the worms, and my neighbors not using my methods have lost heavily by the ravages of these vermin. My remedy is, 'To one bushel of air-slaked lime and one bushel unleached ashes, add ten pounds of salt; mix well and cover over the ground an inch deep, then dig deep with a spading fork and work into the soil at the same time more well-rotted manure. Then cover the surface again with one-half inch of the lime, ash and salt mixture and rake it in thoroughly with the garden rake.' This mixture is a good fertilizer, thus used with the manure, and is at the same time obnoxious to the pests that work in the soil. I sow my seed in hot-beds about the middle of March, and carefully harden my plants by keeping the sash off whenever possible, and set out my plants as early in May as is safe—two and one-half feet apart each way. Into each hill I stick a pole or board one by two inches and eight feet long. When plants are eight or ten inches high, tie up to the pole. When they throw out branches I select three or four of the

strongest shoots and pinch off all the rest: and continue to pinch them off, but tie the others up as they grow. I trim out enough leaf-limbs so that the fruit is not crowded and to get air and sun enough for it. About the tenth of September, I cut off the top. By this severe trimming, the sap is thrown into the fruit, and the sun and the air will ripen it in almost any weather. I mulch the ground well with saw dust around the vines. While in number I may not get as many tomatoes, as if left to run at will, but I get far more weight and the quality is far superior. On his own offer, a grocer paid me in cash, double the price he could get them for from market gardeners, and told me he made more out of them, as he could sell all I could let him have at his own price and sell easier than others, though he did not charge so much for them."

I give the above in full from an Illinois grower, to show how it confirms the positions we have taken, and also how well it will pay to do the careful work necessary to secure these results. It is likely this grower would have succeeded quite as well, and, I think better, to have trained two stalks up the stake and let two run over the ground at will. Although by tying loosely for all the tyings, but the last one, and letting the stalks swing out, a little apart in different directions from the stake, it is not astonishing that he got such fine crops of tomatoes and call it a decided success. Some also add to the above, bagging (as grapes are.)

There is no reason why those who live in cities or towns, as well as farmers, might just as well as not have

all the nice tomatoes they can eat. A half dozen stalks fixed and worked as described above, will produce all any family can eat.

48. Growing Tomatoes in Barrels.—This is a method strongly recommended in the *American Agriculturist* a few years ago. For early fruit, place a barrel as large as a coal-oil barrel, in a warm corner about the buildings. Let it down in the ground about one-third its height. Do not forget to bore three or four inch auger holes in the bottom to let the water out. When the barrel is well packed in, fill it half full of fresh, hot stable manure and tramp it down tightly. Pour a bucket full—two gallons—of hot water upon this manure, then put on good soil eight inches, then a mixture of well-rotted manure and rich, black loam in about equal quantities, until you reach about eight to twelve inches of the top of the barrel, then heap manure around outside. Set three plants in this and trim to two shoots each. Train one of these each up on stakes or on buildings near by. For the other three I advise to take a strip of cloth about six inches wide, spread it over straw wadded around the barrel's chime and tack it fast, then let the latter shoots grow out over this cushion and run at will. Be careful to give these plenty of water. A gallon each day will not be too much. Three or four old barrels set around in odd corners which are likely to be otherwise unimportant will furnish enough tomatoes, and a variety at that, to supply a family of five for a whole year.

49. Trellising Tomatoes.—During the winter, prepare stakes—preferably board one or one and a quarter inches thick, three wide and four to seven feet long—as tall kinds or fruitfulness of soil may demand. Sharpen these so they can be easily driven into the ground as directed in paragraph 45 on "*Staking up.*" On one edge of these stakes drive wire nails—stiff six or eight pennies, having a large, flat head on them will answer. Drive the first nail near to top of each stake, and another each foot downward till the last rail would be about fifteen inches above the ground when set in the field, thus—

STAKE.

These nails should be set so as to incline upwards a little. See cut.

After your growing crop has been worked through thoroughly with the cultivator, then as described in paragraph 45, put in the stakes; only set these so that the edges, with the nails in them, will line along the row just over the plants. Set these stakes twelve feet apart in the row, or as near that as can be to set the stakes four inches from the plants.

With Wire Netting.

Buy in uncut rolls of one hundred and fifty feet each wire netting (such as is used for fencing poultry-runs or yards). It should be galvanized, having three

inch mesh, and such a width as will have it reach from the lowest nail on the stake to the highest. Cut this roll into twelve lengths, each twelve and a half feet long, and hook on the nails on the stakes, stretching each as tightly as a man can conveniently pull it, allowing the ends to lap over each other on the nail in the stakes. This affords a continuous trellis across the field. For trellised tomatoes the ground should be marked, or furrowed out in three and a half, or four feet rows, running north and south where at all convenient. The plants should be set about two feet apart in the rows. In cultivating after the wire netting is put on the stakes use a short single-tree, from a foot to fifteen inches long. To the right end of it fasten firmly a piece of hickory, broad enough to cover the end and clip on single-tree, and long enough to reach eight inches up the tug. It should come to a point at the upper end. When the tug is to be hitched on that side, first slip on it a thin, flat iron ring, then hook on the tug, and slip the ring down over the point of the stick, until it is held firmly to the tug.

This will let the end of the single-tree pass by vines and wires without catching on them, and so enable the grower to cultivate throughout the entire season if he desires. Only we recommend very shallow cultivation after the plants begin to bloom.

It may seem expensive to buy the wire netting; but with care it will last for years, and is as cheap as anything else one can buy. To be sure, you can use other kinds of wire fencing, such as the steel wire Fence Board four inches wide: the Keystone: the McMullen: the

Sedgwick and the Page woven-wire fencing; or one can use smooth fence wires on each side of the stakes, running them the whole length of the row, a pair of them each foot upward from the ground.

The tying up and the pruning will be done the same as described for "staking up" (see paragraphs 45 and 46), except this: we suggest that about four shoots be tied up and spread out along the wires, so that the shoots will, as they grow up the trellis, be equal distances from each other. The particular advantage of the wire netting, or wire fence-board, or woven wire of any kind, is that no tying up is necessary; for when the grower pinches off unnecessary growths, he simply pushes the tops of the growing shoots, now *this way* and now *that way*, back and forth through the meshes, and they will retain their places so on to the top, when they may be cut off, or tied in a bunch above the trellis and left for a shade, if the season is hot and dry. If the grower has plenty of tall, slim undergrowth timber, he can cut long poles and nail these to the stakes; but then he must do some tying up for these. Attend to this fastening up and pruning every week in growing weather. It will take, at least, four prunings to "lay a crop by" in this thing.

You say this is too much work. Well, a great deal of it can be done in leisure times beforehand: and what can not, we can lessen a great deal by arranging to do it as conveniently as possible. Anyhow, a man must not growl about work, if he gets good pay for it. Try a few this way, and I venture you will soon see your way clear

to put more out so. Tomatoes will be earlier, smoother, sweeter, cleaner, more easily harvested and marketed, bring a better price, and nearly as many more can be planted on an acre than for down-culture, and this saves fertilizers. The grower has, also, far better control over his crop, to work with it; to mulch, or to remove mulch-

FRAME TRELLIS.

ing, as the season is dry or wet: to apply spraying decoctions, or mixtures, against enemies: and to regulate sun and air to the fruits. It is justly growing in favor with advanced and careful market gardeners. It is an advantage, too, if one wishes a succession of crops, as early, medium, late—especially for the last named. Frost

will not cut them off so soon. Then, by removing the late plants with a spade, when we reach the danger of frosts, they will be in full bearing, and by rolling together the twelve foot lengths of fencing, plants, roots and all, they can, with care, be put on a sled, hauled to a shed,

HOOP TRELLIS.

unrolled and set up again to ripen after others are gone. These will furnish fruits, quite fresh, till after holidays, and bring good prices.

Tomatoes can be trellised on fences or on out-buildings, or on ornamental frame work of any kind as easily

as can a grape vine, and in the same ways and forms. Only one thing remember, you must have rich soil, and it must be thoroughly worked before you put the tomato-vine into it; then water, trim and work well and you will get elegant results. Some enrich two or three feet square and two feet deep mixing in unleached ashes, air-slaked lime and salt in the following proportions: one bushel each of the ashes and lime, to ten pounds of salt, and applying an inch and half of this mixture to each plat, and work it well into a full spade's depth of the soil. This will keep vermin of the soil out and act as a fertilizer. On this plat is laid around the plant four stout barrel-hoops of different diameter, then three or four stakes are driven into the earth so that the hoops can be nailed on or tied on them—the smallest at the bottom, the next largest a foot higher and so on to the top (see cut) only put two more hoops on than cut gives. Shingling-lath or poles can be nailed into squares or triangles or other shapes, and be employed as above with the hoops. The tomato is to grow up and spread out in these—trimming, tying up and cultivating as before described in the paragraphs immediately preceding this one. This plan is for home use mainly or for city-lot culture.

Trellis on Wire and Lath Combined.

On the authority of the Ohio Experiment Station. I give the following plan for trellising, as it recommends itself to my judgment, it is both cheap and practicable: row them three and a half to four feet apart; trans-

plant in the rows two feet apart; set two strong posts at the ends of each row, and brace carefully; set other stakes between as may be needed, say every two rods; take two wires, about the size used in baling hay, and stretch tightly between these end posts, three and a half feet from the ground; set now common plastering lath, one to each plant, weaving the tops between the wires; tie or tack up the plant to these, and trim as before explained. With care this is a neat trellis and staker combined and will last for several years. It is also cheap.

50. Tomato Culture under Glass.—I have visited thousands of hot houses in different parts of the land and taken many notes of use from those who manage them, which I am tempted to spread out upon the pages of this book, but as my own personal experiences in this line are limited, I think it wiser for me, and better for my readers to peruse an article prepared by that well-known authority on this subject, Prof. E. C. Green, of the Ohio Agricultural Experiment Station. I give his article in full, because in addition to culture under glass, he endorses in it many things already written in the preceding pages:

TOMATOES AS A SPRING AND SUMMER GREEN HOUSE CROP.

BY E. C. GREEN.

The prices that can be obtained for this crop in large quantities in most of the western cities are not sufficient to pay for forcing in midwinter. We have found, however, that the houses can be used to good advantage in growing a tomato crop after the season for lettuce and other winter crops is over, and when the space is not needed for anything else. Working with this object in view, we

use the house for other crops while the winter season lasts and keep the tomato plants in as small a space as possible, which space is not large enough to be seriously missed. As a general rule, vegetable houses are empty after the middle of May and produce nothing after the lasts crops of radishes, and lettuce are taken off. Vegetable houses could in this manner, with almost no cost for fuel and no extra expense for filling benches with soil, be made to produce quite an increase in income, the main work being the growing and training of the plants.

The demand for these house-grown tomatoes has been a constant surprise, and at no time have we had enough to meet it. In the midst of the strawberry and raspberry season tomatoes sold at fifteen to twenty cents per quart, or about double the price of berries. Tomatoes were shipped in from the south, but did not seem to hurt the sale of those from the greenhouse, being inferior in quality and selling at lower prices.

In order to get plants ready to set in the beds about the middle of March, or as soon as the second crop of lettuce is cut, the seed should be sown about the middle of December. If the seed is sown much earlier than this the plants will become too large, and are liable to injury by crowding. No special care is needed in germinating the seed, but the young plants must have good care. Tomato plants are like corn in that they need all the warmth and sunlight they can get, and at all times they should be kept in the warm part of the greenhouse and not allowed to get chilled. The soil should not be allowed to get dry, but excessive watering should be avoided. They will thrive with less water than many other classes of plants.

After the plants get their second or third leaves they should be transplanted, and at least once more before they are large enough to be put where they will stand while fruiting. When transplanted the first time the plants are set 2x2 inches apart, and 4x4 the second transplanting. The plants may be set in beds or in pots, but for various reasons flats are preferred. These flats may be made of any convenient size, but those in use here are 16x24 inches, and $2\frac{1}{2}$ inches deep. When the plants are set where they are to stand for fruiting they are planted directly in the soil 18 or 20 inches apart each way. Large pots and boxes have been tried, but without any apparent advantage, although this custom is recommended for forcing in winter. Although sub-irrigation did not produce a marked

effect upon tomatoes, the beds where this system was in operation were watered with less trouble and more satisfactorily than those where surface watering was practiced.

The last transplanting should be done sometime in March, for after the middle of this month the benches cannot be used for lettuce profitably, as the houses are liable to get too warm, and the plentiful supply of hot-bed lettuce brings the price down; but when the tomato plants are set out if good lettuce plants are set between them, a fair crop of lettuce may be grown before the tomato plants reach any considerable size. But after the lettuce is off the tomatoes should have the entire ground, and should be given a good mulch of fine manure, which will assist in holding the water that is applied to the bed. After the lettuce is off, or perhaps before, the tomato plants should be trained to one or two stalks.

To train the plants some support must be given, and wire or string is preferable to stakes. The top of the wire may be made fast to the rafters, and the bottom anchored by means of sharp wooden pins of hard wood driven into the bottom of the benches, or by wire stretched across near the surface of the ground. The plants must be tied to these upright strings or wires frequently as they grow.

Pruning is another part of the work which is very important, not only to increase the size and earliness of the fruit, but to get the largest yield possible on the smallest space, and to keep the plants in good shape. It is not the nature of the tomato plant to confine itself to a single stalk, and when compelled to do so its efforts to grow side branches are very persistent. Not only will sprouts come out at the axil of each leaf, but the ends of the blossom stalks will develop into branches and even the upper surface of the main vein of the leaves will throw out sprouts. All of these must be taken off, or there will be a tangled mass of vines if the plants are very close together.

Varieties.

"The varieties that do well out of doors are the ones that will do well in the house. It is best to raise the kinds that the market demands. The Acme and Beauty are the best of the purple kinds that have been

tested, although no better than some of the red sorts. Among the red kinds the Perfection and Paragon are good. The Lorillard, which has been highly recommended for forcing, has not done as well under our system as some others. The early, rough varieties are not desirable, as the pruning seems to make them more irregular. We have given the Atlantic Prize, one of the best of this class, a thorough trial, and have discarded it because it does not sell well. The same remarks apply with even greater force to Hundred Day, King of Earlies and Salzer's Earliest of All. The Dwarf Champion has some qualities to recommend it. The plants can be set closer together and nearer to the glass than other varieties. The first fruits that set are of fair size, while on some other varieties they are small. It is difficult to prune on account of the heavy leaves hiding the sprouts, and it does not yield heavily. The Golden Queen is one of the best of the yellow kinds, but there is little call for a yellow tomato in this season of the year. The Potato Leaf is the opposite of the Dwarf Champion as regards ease in pruning, as it grows very long and spindling. It does not yield heavily, but the fruit is quite shapely and of fair size.

"Besides the kinds mentioned, we have tried Ignotum, Matchless, Michel's New, Livingston's Stone, but they have no qualities that render them more desirable than those first named. Bulletin 28, June, 1891, Cornell University Experiment Station, by Prof. L. H. Bailey, touches many points in tomato forcing not treated of in this paper, and will be found useful to those wishing to force tomatoes in mid-winter."

Prof. Green thus advises tomatoes as a spring and summer crop under glass after lettuce and other product. It can then be forced with profit. He says: "The essentials to be regarded are, (*a*) to have the plants sufficiently advanced to set in the beds about the middle of March, or as soon as the last crop of lettuce is cleared off; (*b*) to prune off all the lower branches and suckers; (*c*) to keep the plants tied up to supports."

51. Tomato Enemies, Diseases and Remedies.—It is encouraging to know, that as a field crop the tomato has fewer and less formidable pests than any other crop of so extensive culture.

But it has some, and every grower will get acqainted with them (often to his sorrow), as the crop passes through its various stages from sewing the seed to the ripening of the fruit. We will mention some of them under their common names, together with such remedies as are good to use.

52. "Damping Off."—I name this first, because you are likely, as a grower, to meet with it first. It is a trouble that manifests itself while the plants are young, by rotting them off near the surface of the ground. You will observe them to bend over, wither away, and die. There is difference of opinion as to the cause of it; but I favor the idea that cold, dark, damp weather encourages it. If there is added to it an atmosphere that is foul to the tomato, such as one might

expect to find in a hot-bed unventilated or not aired out daily, one would expect to find such a result. If this is the cause, then the cure is better ventilation, more judicious heating, and greater dryness.

53. Cut-Worms.—If you plant on sod-ground, or on an old pasture, plowed up (which is very good for a tomato crop), then look out for cut-worms. Your plants will not be long in the ground until you will see that something has cut them off near the ground. Sometimes these are very destructive, just as they are on corn. I consider it an advantage to plow late in the fall, and it will not hurt to plow again in the spring. Tearing up the ground thus often, seems to destroy the worms, and generally upsets their designs upon a tomato crop.

If it is remembered that the plants are set out in the field quite a considerable distance apart; and that this worm does not eat off roots only by accident, but comes out at night to feed on the stalk, and that it burrows into the ground again when his meal is over, leaving the traces on the surface, where he went into it; then it will not seem such an insuperable task to go and hunt them out and kill them. They are rarely more than an inch down in the soil. A few hours' work will kill many, and save many a plant. Robins, yellow hammers, meadow-larks, bluejays, mocking birds, and quails, are very fond of these worms, and are generally friends of the grower. I encourage all laws that defend them, even if they do feed on our cherries be-

times. Sometimes I think they take these more for the worm in them than for the cherry. Toads should also be let alone in your fields, for they do no harm, but keep fat on such pests as cut-worms. I know they are not particularly handsome creatures, yet upon more intimate acquaintance with the toad, we are reminded of the old and true adage, "Pretty is that pretty does." Besides he has ways—real cute ways—of disposing of these worms; you only need to see him do it once to be ever after his friend. I know of nothing that can be put on the plant to kill these worms which will not also injure the plant. Slug-shot, stirred pretty liberally and thoroughly into the ground around the plant to the depth of an inch, will kill the worms, and act to some extent as a fertilizer for the plant.

54. Colorado Potato Bugs.—We all know this bunchy beetle and how destructive his ravages are. We all know how he "does business on the first floor," employing his whole family, from the least even to the oldest. Seems like they do all possible to push on the work of destruction to its bitter end. But it does not relish the tomato as it does the potato, and so is not so bad on it, yet it does attack the tomato and do harm sometimes. Take an old fruit-can and punch holes into the bottom with a nail, or better with a round long punch from the inside outward, fill with slug-shot or other insecticide and dust the plants thoroughly while the dew is on them. It will then stick to them, kill the bugs, also cause the everlasting slugs to loosen their

grip and bite the dust in the agonies of death. They can be treated in the same ways as are common when on potatoes.

55. The Tobacco-Worm.—It is a large green worm, about three and a half inches long, and three-eighths of an inch in diameter. It has a long horn upon his rear back, and when disturbed he jerks himself from side to side, and twists himself about as though he meant to do dangerous work with this horn, but it is like the feints of a drone-bee to sting,—it don't do any hurt. When tobacco was a great crop in these parts it was called the "tobacco-worm," but it is known mainly as the "tomato-worm" now. It feeds on leaves and green tomatoes mainly. During this last year—1892—it was the most formidable enemy that ever attacked the tomato in these regions. The first thing to do is to raise a good sized bed of petunias near the tomato field, so as to have them in full bloom by the time the tomato plants are growing nicely in the field. If you are about these petunia beds in the early evening, you will soon discover a large miller—almost as large as a humming bird—attracted by the sweet-scented flowers. He is in search of honey. If you watch him closely as he hovers over a flower, you will see him unroll a long proboscis, two to three inches long and kept in a most beautiful coil under his nose when not in use, thrust it into the flowers and take up the sweets that are hid away in its depth. Now while he eats thus is your opportunity, having a short, broad paddle in hand slap one on the other with said

miller between them, or hit her a clip with one paddle hard enough to kill a rat, for this dusty and lusty insect is the moth that lays the eggs which will hatch out in due time into the tomato-worm. Therefore visit the petunia beds each evening, and make the destruction as thorough as possible, for each one you destroy keeps many worms from appearing on the crops later. Two careful, spry boys or girls will, with a small reward for each dozen millers they kill, thin them out wondrously. But if the worms do appear upon the plants, as effectual a method for destroying them as any, is to put a thin, tough switch in the hands of the abovesaid boys or girls and direct them to give each one they see a quick, smart stroke which will cut them in two and destroy them. Reward them at so much a dozen and offer a slight premium for the one who gets the greatest number killed. Their sharp eyes, nimble feet and agile hands will not fail to reach most of them with their switches and sever their connection with the tomato business forever.

Nature usually provides to keep matters on a balance by raising one thing to feed on another. But man in his ignorance and folly interferes with these wise arrangements, and often destroys this balance. This I always think of when I see different parts of birds on ladies' hats, knowing that with the over-killing of birds will come the over-production of insects. Now, in regard to the destruction of this worm the grower has a formidable ally in a long-legged ground-colored fly. It covers the worm with small, white eggs or nits

about one-sixteenth of an inch in length. This fly stands high on her legs a few inches behind the worm while it is eating, and enjoying its repast so well that it is at peace with all the world, and suspects nothing; then quick as the bot-fly, it darts forward and fastens the egg on the flesh of the worm. Of course it makes heroic efforts to stab the fly to death with its bold-looking horn, while the fly stands back in place unharmed, and apparently enjoying its safety, and success, and the prospect of another deposit soon. As soon as the worm forgets his sorrows, and, acting from the impulses of a voracious appetite, begins to eat again, the alert fly deposits another live egg upon its carcass. And so it keeps on until it sometimes literally covers the worm with eggs, which soon suck the life out of the worm, and it works tomatoes no more for a living. This is more important than many suppose, viz., not to kill these flys, nor destroy the worms which have the white eggs on them, for I have good reasons to believe that the flys usually deposits its eggs upon the female worms, and rapidly destroys the source of supply for lusty millers, and one-horned hungry worms. It is never mean assistance to get the help of the allies of nature in the destruction of the pests which prey on our growing crops.

56. Tomato Blight.—Of this I have had no experience, but I see it mentioned in scientific writings about the tomato. I will give a quotation or two, giving their remedies, for this may prove helpful to my readers in some part of the country:

A Remedy For A Tomato Pest.

I inclose a tomato twig. You will help many by publishing the cause and remedy of its trouble, as it is next to impossible to raise tomatoes on this account. The vines are attacked in all stages of growth until the fruit is full grown. If a plant ripens its fruit without any sign of the trouble, it is not attacked.—[G. W. Wilgus, Takima county, W. T.

The plant sent to me is affected by a little fungus known to botanists as Cladosporium fulvum. This little parasite grows in the tissues of the tomato and destroys all the parts with which it comes in contact. It is propogated by means of minute bodies called spores. As a means of preventing it, I would suggest that the plants be sprayed, every two weeks during the growing season, with a solution made by dissolving half an ounce of flour of sulphur to the gallon of water. The first application of this solution should be made before the disease appears, or when it is first noticed. The effect of the treatment is to prevent the spores from infecting the growing vines, and to do this care should be taken to reach all these parts with the spray.—[Prof. B. T. Galloway, United States Department of Agriculture.

Mr. J. W. Day, of Central, Miss., in his book, says: "This disease is spreading very fast in the South where tomatoes are often grown in the same locality. It begins by the vine becoming wilted for a day or two, then the bottom leaves turn black and slough off. Sometimes the leaves turn yellow the first two or three days."

"The best preventive is to change patches every year; as they are dead-sure to be affected with blight if you do not let the land rest a year or two between crops. There is some fungus in the vines, and rotting tomatoes left lying about, that literally impregnates the land with this disease, and blight will surely appear the next year. It is worse on a dry year than a wet one. It is often kept over on the stakes. These ought to be fumigated, or disinfected. Take crude carbolic acid,

one part acid to twenty parts water, and sprinkle the stakes or trellising to be used again well with this mixture."

Another thing I would at least guess to be an advantage, and that would be to gather up all affected or decaying vines or tomatoes and burn them, and to keep this work done up as closely as possible without destroying good vines or fruit. If any fungus disease appears in culture under glass, everything must be cleared out, the whole place disinfected, new soil, new plants and new supports found for them; and to do this too, every fall. Again I would think judicious spraying would do good. Hope our Experimental Stations will tell us soon about it. It might be too, that fertilizers could be found such as potash lime and salt mixture which would destroy the fungus that causes this blight. By all means let us have some thorough experiments on it by our Southern growers and Experiment Station men.

57. Black Rot in Tomatoes.—This, as its name indicates, is a disease that appears first at the blossom end of tomatoes, and is worst upon the earliest kinds. Later in season it usually disappears. Coming on the earliest it becomes the dread of Southern growers and all who aim for "earlies." The cause of it is not certainly known, and I sincerely hope some ambitious experimenter will make himself justly renowned by learning and telling us all about this trouble.

One writer says: "Sufficient critical attention has not been given to this question, yet there appears to be some truth in the idea that fresh stable manures tend to induce this fungus disease, hence chemical manures are to be preferred for this crop."

We give also the experience of another as follows:

What Causes Tomato Rot?

G. H. MAHAN, CHENANGO CO., N. Y.

It is variously claimed that this disastrous disease is the result of either extremes in temperature, an exceedingly wet or dry season, the using of plants grown from seed saved from a previously affected crop, etc. Now, while I would not say that these causes may not tend to this effect, yet I am inclined to the belief, based on experience, to attribute it more directly to the fact that the plants had suffered a sudden check at some period of their growth.

Each spring I raise large quantities of garden and bedding plants, Tomatoes being one of the principal ones of the former. After being transplanted once or twice in the boxes or "flats" in which they are grown I usually set them in the open ground quite closely together, removing them from there as wanted for selling. I usually try and leave a plant every three or four feet in the row to mature its fruit.

The foregoing is what was done the past season, and now the point I am trying to make is this: plants were taken from this bed and removed to three different locations in towns widely separate, combining at least two very different soils, and in each instance three-fourths of the fruit borne on these vines were affected with rot at the blossom end, while the plants left remaining in the rows bore exceedingly fine fruit, perfectly free from the affection. Now why was it?

Certainly the season was the same in each case and they were all from the same seed. To my mind it was clearly the cause given above; that at the time they were taken from the bed and set out, the weather being very dry, the plants sustained a check in their growth which so weakened their vitality that they became an easy

prey to their most common ailment. Care should therefore be exercised at all times in setting such plants to arrange to do so in a wet or cloudy time and thereby remove the tendency to this fatal disease.

It is also said to be worse in a dry season. Now the causes would sum up about this way: Stunting the plants by either extremes of cold or heat, too great change of temperature in transplanting, viz: from warm, moist hot-beds to dry, cool frames, or to open field, when cool and dry and without sufficient moisture at the time, and possibly fungus growths produced by too much fresh manures in the soil about the plants. The cure for this last would be to use chemical manures or at least well-rotted manures with which has been mixed hard-wood ashes, lime and salt.

The preventives for the others is best possible preparation of the soil by deep plowing, thorough pulverizing, judicious fertilizing and watching better the conditions of heat and cold, and more care when transplanting. I submit also the opinions of others on "*staking up*" as a means of preventing rot:

Tomatoes on Stakes in Wet Weather.

I notice that N. S. complains of his tomatoes rotting badly on the ground. I have not for many years been troubled in that way, as I have trained them to a single stake, and by pinching off three to five of the lower shoots and afterwards tying the leader firmly to the stake, the fruit is kept up and grown perfect. The stake needs to be a good one, about six or seven feet long, firmly driven into the ground. Of course, there is some work in this manner of growing the crop, but it has the advantage of growing a fourth to a third more plants, getting the weeds out of the way easily, and having more and finer fruit.—G. N. S., *Wellesley Hill, Mass., in the American Garden.*

TOMATOES TRAINED TO STAKES.

Last spring I concluded to give the Perfection Tomato a fair trial on stakes. I had a garden in the heart of the city 150x180 feet, surrounded by a fence six feet high. On the sides facing east, west and south I set on May 25th, three hundred plants that had been well grown, and five-inch oak stakes six feet long by one-and-a-half inches square were driven into the ground beside each plant. The plant was allowed to grow but one stem, all side shoots being pinched off until the top of the stake was reached. They require the pinching and tying four times during the season and set an average of six clusters of tomatoes. Not one rotted and the flavor was so superior that we had as ready sale for them for slicing as we found for our strawberries, and at from ten to twenty cents per quart when bushels were offered in the groceries at from twenty-five to sixty cents per bushel. The first ripe tomatoes were picked July 21, and the last on Nov. 4th. For retail sales or family use I shall never train in any other way.

Steubenville, O.

The advantages of staking, or trellissing, become more and more apparent each year, and in each direction we may think of it. If the Black Rot is caused by any fungus growth, "staking up" will permit of spraying to advantage against it. Always destroy all tomatoes and vines on which Rot appears.

58. "The Borer."—This is a short, stout worm that buries itself into the body of the fruit. It is the same as you see sometimes in sweet corn, inside the husk, and imbedded into the very kernel itself. This pest is worse in the South as it appears also among the cotton. It is moving northward, however, and is already showing symptoms of becoming an enemy to be feared by tomato growers. Its early destruction should be sought for by all diligently.

Friend Day suggests to kill the moth at night by open lights in the field, into which they fly, and are killed: to spray with weak decoction of London purple, or sprinkle it dry on them, but only a very little in a place, as it burns the leaves of the tomatoes; and to plant sweet corn along side of the tomato field, as they prefer it above a tomato diet. They will gather on it and leave the tomatoes almost entirely alone. He also suggests to gather all tomatoes which show signs of cracking, or evidences that the worm is in them, because it will bore into several tomatoes before it quits. These should be, when gathered, mercilessly destroyed.

A few years experience will teach the grower much about these pests and diseases. Let me suggest that you watch constantly and carefully whatever endangers your success. Remember, everything in this world has its drawbacks; and every crop has its difficulties that beset it. The man succeeds best who learns as he goes on to lessen these more and more and to add to his business little advantages which increase his income. It only takes a few such leverages over your competitors to turn the trade your way. Watch for them and work for them. It pays.

59. Harvesting, Marketing, Shipping and Selling.—As these items of business occur together, we will describe together. The tomato is perishable fruit and must be disposed of within ten days after they begin to ripen. To put it in round numbers, ripe fruit may begin to appear in one hundred days after seed is

put into the ground. Many conditions of season, culture and soil enter in to vary this time for "earliest of all" however, and you must remember that in building up your expectation. I see some seedsmen advertise kinds that will ripen in seventy-five days after sowing the seed. While I do not discourage your trying a packet, I feel much safer in directing you to be ready to harvest in one hundred days, or even later. Whenever it does come, you must be ready to do quick work. Get reports and keep posted on the markets. Have all boxes, crates, baskets and hands to use them, at command, for even a day's time will lose, or make you money as you use it.

60. Harvesting, etc., for Shippers.—Remember this is a time when you will be in a hurry. As one grower said to me, "It will be dollars to you often to get them into market quickly." Long before the crop ripens then use up some leisure moments in securing four good, stiff peck-baskets for each picker you are to employ. Line them with felt paper or similar soft material and cover with muslin. This is to keep the rough parts of the basket from bruising the fruit as it is picked into them. You cannot be too particular about keeping the fruit whole. It is always money to you to get your fruit into market in the best possible condition, and this means the most scrupulous care from first to last in handling it.

Have ready four-quart and eight-quart boxes, also three-peck and four-peck crates, such as are ordinarily

used for shipping. Of course if you can invent something better and that will sell your fruit better, do not hesitate to use it.

It will be necessary if you handle any great acreage, to have a packing shed which should be roomy, light, dry and as handy as you can arrange everything to do the work well and quickly.

For the first picking, each gatherer takes two of the lined peck-baskets, goes into the field and picks only those which are full-grown and all that show the least tinge of red at the blossom ends.

Put only the most careful hands at this work. If you must work some careless fellows, let them carry to the packing house and return with other empty baskets for the careful pickers. Direct these to push off the stems and anything else that may be on them; to *place* them—not throw or drop them, even for an inch—into the baskets. There must be no *bruises* made in picking or getting ready for market or there will be *black* places when unpacked to sell, and this means either lower price or none at all.

When the baskets are full, *carry*, not *haul*, to the packing house; and this suggests that it may be advisable to locate it centrally in your field. In no case pour out of the baskets, but pick out with the hands; wipe off the dirt and sort into lots to suit your crop to the trade. Mr. Day, of Mississippi, has had about as much experience as anyone else, and he advises to divide "into seven grades—ripes, mediums and greens, and each of these again into two grades, viz., into large ripes and

small ripes; large, medium ripes and small, medium ripes; large greens and small greens, while the culls make the seventh grade and are not to be shipped at all." As Mr. Day says of the above grading, they look better, sell better, keep better and pack better.

If he who sorts them in the packing house arranges a set of six flat trays—one for each assortment—on some support about him at a convenient height, that is, in front of him, two trays, two on the right and two on the left hand, then by placing the full basket from the field between him and the middle tray so that the top of it will be even with the top of the trays, he can clean and sort into the trays rapidly and accurately, just as he removes them from the basket. He should be careful not to mix colors in same trays. When dry, they are packed into the boxes and crates, hurried away to the cars to fly by day and by night away to the Northern markets.

When packed they should be marked on outside of crates just what they are, and in due time commission men and other salesmen will learn your brand and seek your stock. They can make more out of them and will give more for them. That the reader may know how commission men feel about this business, I will quote from Mr. P. M. Kiely's "Southern Fruit and Vegetable Shippers' Guide and Manual:

"The importance of proper handling, packing, etc., is not properly estimated. If ripe Tomatoes are going to be gathered, be sure you put them in a separate box; but ripe stock should not be sent forward unless you are only a few hours' ride from market. Even then they are liable to arrive in bad order.

Generally speaking, the proper time to gather and pack is when the tomato is full grown and beginning to color or partly colored, depending upon the time of transit. The warm weather prevailing at the time will ripen them fast enough. You should not lose sight of the fact that a good many are wanted for re-shipment, and to be fit for this trade, the best we have must not be fully ripe when they reach us. When shipped by freight they must be gathered still sooner, when full grown, before coloring sets in. Freight is not desirable unless you have some assurance in regard to time. A good many come from the South by freight that are almost worthless on arrival. Last year considerable came entirely too green; that is, were picked and shipped before *full grown*, and most of such stock arrived rotten. The regular peach box (one-third bushel) should be used.

The best packing usually appearing in this market (St. Louis) is that from Southern Illinois, where the most experienced growers reside. Their packing is almost perfect. No knotty, stunted, overripe, or otherwise imperfect stock should be put in the box under any circumstances. The receipts from that section are always sought by the shippers here in consequence. There is a very wide demand for the Tomato; all classes being purchasers as soon as the price becomes reasonable. The demand for it is steadily on the increase.

A great deal of money has been made off the Tomato, not only in the South, but also North and East. The South is destined, however, to remain the most profitable region to cultivate them for commercial purposes. The improved facilities and lower rates for reaching Northern or distant markets, continue to afford substantial encouragement. An acre of ground can be made to yield enormously in efficient hands; from one hundred to four hundred bushels, according to circumstances, location, etc. Two hundred is, perhaps, the limit in the South, and four hundred in the North.

As to varieties, will say that the "Acme" should head the list for this market, and for most other markets, too, as it is a universal favorite. Livingston's "Beauty" and "Perfection" close to it, and any smooth, round, medium-sized variety might be added."

Sometimes they are wrapped like oranges in paper. I see almost none upon the northern markets in that style. I merely mention it here in passing. It should be

used for the first picking anyhow and also for the most fancy markets in the largest cities. It can be done to advantage for this kind of a market.

61. Harvesting, etc., for Short-Distance Shippers.—I refer to those not over twenty-four hours away from northern cities; they might be called intermediate shippers. They need not harvest and ship until the fruit is riper. They will reach the markets in good shape and out-sell all the earliest varieties that come farther to market. These come in between those grown in the extreme south and the "first early" of the north, and certainly meet a good demand, but to get this trade the intermediate shipper must exercise great care in picking, packing and getting them promptly on the market. Pack tomatoes for this market at such a degree of ripeness that they will reach the market ripe. Place them tightly in the crate, so as to leave none loose, but do not mash them. Remove the stems and wipe each tomato with a cloth as they are put in. Make a special effort to have only the choicest fruit go to market. It may not seem to pay you, but persevere until you get your name up in some market for always having choice products, and then your success is assured. Not as much is made of this trade as might be by growers. Go to Southern Illinois and take some lessons.

62. Harvesting, etc., for the Home Market Gardeners.—This is done, not for the fun of it, but for the money there is in it. This means, put up your stock

or fruit in the best possible condition to be attractive and desirable by those that use them. I am aware that my readers are liable to get tired being *told* this thing so often, but I am also aware that the home market-gardener must not get tired *doing* this or he will suffer loss. The matter of first importance to him is to get ripe tomatoes a few days earlier, if possible, than most other people. If you can do this, you get the *first run* on tomatoes and impress it on the minds of all classes of customers, that you are "well-up" in the business, are a careful man and expect to serve them well. To encourage you in this, remember that most of the work you do to get this result, will come before spring or summer work commences, when, in all probability you would not do much else anyhow, but it is just that much ahead of the ordinary time of working, that only a few will *take the trouble then*, to do what is necessary to have ripe tomatoes for the home market during the last days of June or the first of July, see paragraphs from 45 to 51, for the culture necessary to attain this end.

You will need the same preparations for your crop as are given in the last two paragraphs and such other as we may name as we go along. Gather these first-ripe, home-grown tomatoes into felt-lined baskets and handle them like eggs, with care. *Carry* them to the house and sort as before described, only into four grades, viz.: ripes and nearly ripes, and these again into larger and smaller. Always cull out those which would hurt sales. Never put an inferior article on the market, it will pay you far better to throw it away entirely, although

any kinds of tomatoes are relished by hogs, cattle or poultry and if given in small feeds will do them good. The "earliest of all" should be put in berry-boxes and sold at the same price as strawberries. Of course, these will be mostly grown under glass; but raise a few this way because it lets you in ahead of others and gets the trade. The second "earlies" are to be assorted into one-quart and four-quart boxes or baskets. These should always be rounded up well in the box, so as to look as full as possible, not to look like they would roll off. They should all be "faced up" in the boxes from the bottom to the top; that is, put the tomatoes in the box with the blossom ends up, or all the stem ends down. Some people say this is not honest, but these same persons would curry a horse well if they were taking it off for sale. It seems to me perfectly legitimate to make our fruit as inviting as possible. Every young lady acts on this principle, and rightly too, for you and I, my dear friend, would not want to make a wife of a slouchy girl. But see to it that you do not put the nicest ones on top and the poorest in the bottom. That is a misrepresentation and is not honest, nor will it pay. While it is right to make the most and best of what we have, it is not right to sell inferior for good and people will not be duped by us long in this or any other way. Sell in the one-quart boxes as long as you possibly can, for there are thirty-two of them in a bushel, and at a few cents a quart you are getting a better price per bushel, than if you sold at bushel rates. You can do this too, because many only want enough at this time of year for

slicing for one day's use, and do not mind a nickle or even a dime for a box of choice ones. Have some real ripe and some only half-ripe from which to fill up the box. It pays to suit the customer's taste. Get them to market as early as possible; but do not try to compete with the fruit away down South, as that would be useless. But my early tomatoes are picked fruit, and have a very different appearance and flavor from that of the South and I usually get very fair prices. As they get cheaper you can put in an extra one now and then, as it may be appreciated, but you must not spoil your customers by being too free with donations.

Never empty a box or basket into a customer's market-basket: always lift them out with the hands and "face them up" as they were in your own basket, then they will look as they are and also appear to be what he bought of you. It takes a little time, but if you say something a little cheery while you do it you will satisfy your customer and that goes a good ways in bringing him back to you again. Whether you sell from the wagon, or on the street from the table, aim to appear at regular times and as near in a given place as possible. The customers will look for you and wait till you come. This is the time to take orders for canning. There will likely be some very nice cracked ones among your fruit, especially during some seasons. Never put these in with the rest, but put in a lot by themselves and "lump them off" to some one who wishes bulk rather than quality and with a little reduction on regular prices, you can turn them off and get all they are

worth. After this, as you approach to the bulk of the crop, gather into boxes or crates, which you ought to make yourself, so that they will fit your wagon and not jostle about in it, for this spoils tomatoes for canning. Also they should hold exactly, when rounding full, a peck, a half bushel and a bushel. Take these directly to the field and as you pick, rub off stems and dirt, sort into the crates and as fast as full, place in the wagon. This saves handling, but does all necessary at once, and if picked and packed thus, when the weather is dry or nearly so, they will get to market in excellent shape. You can't gather so fast this way, but you can get all done that ought to be done this way as fast as any and handle them but once. Of course, do not forget to "face up" as already described. Observe the same rule about not turning them in the baskets or upon a customer's table. Talk nicely all the while, "face them up" in a nice neat pile upon the kitchen table and you will please this time and sell more readily at another time. Don't forget that a measure only level full will not sell one-half as quickly as one rounding full.

The bulk of the crop is sold for canning, and if you are fixed to handle a large quantity there is a handsome profit in it at thirty-five cents a bushel. When the height comes I go to the canning houses and get a fair price, carrying them the very best quality and all uniform in appearance throughout. I have found that in whatever you are dealing and no matter with whom, if your fruit or vegetables are just as fair and large at the bottom and middle of the package as at

the top, the price will be better than in any other way. Persons who are accustomed to buying know at once how to rate their customers. Five cents or ten cents on a bushel makes a large sum in the aggregate, and will pay the buyer as well as the seller, if he knows at a glance what he is getting and can depend upon it. Start a wagon out over your city, and supply the poor with cheap, wholesome tomatoes, and still get a fair price for it at this time.

As for late ones it pays well to aim to meet this demand. Some people never get anything done when it ought to be done, and so they will not get their tomatoes canned till the bulk of crop is harvested and sold; if now one has nice fruit to sell then he can do so at a good figure. It will pay to risk hitting this market. It is not a question of "can I sell them?" but "can I have them?" See paragraph 49 for methods of culture, so as to get them with reasonable certainty and safety.

One should keep favorably acquainted with commission men and the markets in different places, and often shipments can be made to advantage. On the advantage of late crops and sales I quote from the "Maryland Farmer," as follows:

"I raise a bed of tomato plants in the open ground for late planting. They are pretty fair sized plants about the first of June, and a quarter of acre in the field is reserved for them. They come forward generally fully as well in proportion as the early plants. I have one pretty good picking from them of ripe fruit; but as frost approaches they are usually loaded with good-sized green tomatoes. I have sold some of these green tomatoes, but I do not give that as much attention as I might, for I have something better in view.

"I have a good warm cellar of large dimensions, and across this I stretch poles, just as for hanging tobacco, and I pull up the tomato vines by the roots, loaded as they are with green fruit, and hang them, tobacco fashion, on these poles in the cellar.

"There they gradually ripen from the beginning of frost to the Christmas holidays, and when I go to town with my little stock and get my 25c or 30c or 35c a quarter of a peck for them, it pays.

"If I had a big cellar, properly prepared for the work, I could coin more money from an acre of late tomatoes, with less actual expenditure of labor, than from any other crop that is grown in the vegetable line.

"I give my brother farmers this item, trusting it will do them as much good as it has done me. I remember the first time I carried in a few bushels of these tomatoes, expecting a little spare change from them, and came back with $19.45 for them, I felt a great deal astonished at what I had done. But it has got to be a common thing now and I give it to you."

63. The Uses of the Tomato.—I claim to be a "ladies' man" in the best uses of that phrase; and I want to put something in my book for them. The uses of the tomato enters now into the daily food of nearly every family, in the city or in the country. It is both a vegetable and a fruit; and has uses co-extensive with all vegetables and all fruits. I know of no other one garden or field crop that can be put to so many varied uses as the tomato, and still be so palatable to most appetites.

It may be canned for home use, or general markets, as other fruits. It makes soups by itself, or with anything else used in this way. It makes excellent sauces, salads, catsups; or pickles, sweet, spiced, and sour, green, ripe, or in mangoes. They can be sliced, baked, escalloped, dried, fried, made into figs, stewed, or into anything else desired; and it is a wholesome diet for sick or

well: old or young: rich or poor: leisurely or laboring; wise or otherwise; saint or sinner.

I here append some recipes, not for reading as much as for reference and to show the various and principal uses of the tomato. I do this with becoming modesty: for a man feels about as awkward telling the ladies how to cook, as a woman would feel were she to attempt to plow a straight furrow across a forty-rod field. I ought to say, too, that I have gleaned these recipes from all kinds of sources, but have submitted them to the judgment of competent cooks who declare them valuable and reliable. Use, if possible, only fresh, nice tomatoes, and you will be apt to get them if you secure as soon as they get cheap enough for you to invest in the quantity you wish to use. The last of the season are never so good as the first: and especially after frosts have hurt the vines.

Tomatoes for the Sick.—"The tomato is the best of all vegetables as an article of diet in sickness, especially in bilious diseases. I have heard that they contain calomel, or the properties of it, and was, therefore a medicine as well as an article of diet. When one is first beginning to recover from a bilious attack they can eat a tomato with a little salt on it when they can take nothing else, and if you don't like tomatoes try to learn to eat them, for it is a most useful taste to cultivate. I think it was the hardest task I ever set myself to learn to like them, but I was determined I would learn, and I did, and most sincerely thankful have I been since, particularly when recovering from an attack of chills and fever."

Mother's Sliced Tomatoes.—"Prepare half an hour before dinner, scald a few at a time in boiling water, peel, slice, and sprinkle with salt and pepper, set away in a cool place, or lay a piece of ice upon them. Serve as a relish for dinner in their own liquor. Those who desire may add vinegar and sugar."

Sliced Tomatoes.—"Scald ripe tomatoes; let them stand in cold water fifteen minutes. Then take off the skin and slice in a dish garnished with sweet peppers."

It adds to the above to employ tomatoes of different colors and serve in alternate layers, also choose those of about the same size, or otherwise put the largest layers in the bottom of the dish.

Sliced tomatoes may be served with Mayonnaise salad-dressing which is made as follows: "Into the yolk of one raw egg stir all the olive oil it will hold: if dropped in very slowly, half a pint of oil can be used: season with cayenne pepper, salt and mustard."

Raw Tomatoes.—Peel and slice with a sharp knife. (Tomatoes should always be cut just before using.) Lay in salad bowl and season with dressing, made in following proportions: Beat together four table-spoons vinegar, one teaspoon each of salt and sugar, half as much mustard, and when these are well mixed, add gradually two tablespoons of best salad oil.

Stewed Tomatoes.—"Scald by pouring boiling water over them, peel, slice and cut out all defective parts; place a lump of butter in a hot skillet, put in tomatoes, season with salt and pepper. Keep up a brisk fire and cook quick as possible, stirring with a spoon or

chopping up with a knife (in the latter case wipe the knife as often as used or it will blacken the tomatoes.) Cook half an hour. Serve at once in a deep dish lined with toast. When iron is used, tomatoes must cook rapidly and have constant attention. If prepared in tin or porcelain, they do not require the same care."—Mrs. Judge Cole.

Fried Tomatoes.—No. 1. "Slice tomatoes quite thick; pepper and salt them; roll in flour; and fry in equal parts of butter and lard. Put them in a dish to be served and keep hot. A little flour and butter mixed; stir into the skillet with a cup of milk; boil until well thickened; pour over the tomatoes."

No. 2. "Same as above, only after rolling the layers in flour dip them into beaten egg, then fry, etc. These may be served with or without the flour, butter and milk dresssing named in No. 1."

Tomato Toast.—"Run a quart of stewed ripe tomatoes through the colander; place in a porcelain stewpan; season with butter, pepper, salt and sugar to taste; cut thin slices of bread, brown on both sides, butter and lay on a platter, and just as the bell rings for tea add a pint of good sweet cream to the stewed tomatoes, and pour over the toast."—Mrs. S. Watson, Upper Sandusky.

Tomato Custard.—"This is recommended in the Modern Cook Book as a good diet for invalids. Make a custard of four eggs, one quart of milk and one cupful of sugar; add one pint of stewed tomatoes, and bake quickly in small cups."

Escalloped Tomatoes.—No. 1. "Put in a buttered baking dish a layer of bread or cracker crumbs, seasoned with bits of butter, then a layer of sliced tomatoes seasoned with pepper, salt and sugar, if desired, then a layer of crumbs, and so on till the dish is full, finishing with the crumbs. Bake from three-quarters of an hour to an hour. Onions, prepared by soaking over night in hot water, dried well, and sliced in nearly half inch slices, and browned on both sides in a frying-pan with butter, may be added, a layer on each layer of tomatoes."

No. 2. "Put alternate layers of sliced tomatoes and bread crumbs into a bread-pan: season with sliced onion, butter, pepper and salt; bake for one hour."

Baked Tomatoes.—No. 1. "Cut a thin slice from blossom side of twelve solid, smooth, ripe tomatoes; with teaspoon remove pulp without breaking shell; take a small, solid head of cabbage and one onion; chop fine; add bread crumbs rubbed fine and pulp of tomatoes; season with pepper, salt and sugar; add a teacup of good sweet cream; mix well together; fill tomatoes, put the slice back in its place, lay the stem-end down in a buttered baking dish with *just enough* water (some cook without water), with a small lump of butter on each, to keep from burning, and bake half an hour, or until thoroughly done; place a bit of butter on each, and serve in baking dish. They make a handsome dish for the dinner table."—Mrs. S. Watson. Upper Sandusky.

No. 2. "Fill a deep pan with ripe tomatoes (as many as will lie on the bottom), after first rounding a hole in the center of each and filling it up with bread crumbs

or crushed crackers, and seasoned with butter, salt, pepper and sugar: Pour a teaspoonful of water in the pan, to prevent from burning. Bake brown, and send to the table hot."

Broiled Tomatoes.—"Take smooth, flat tomatoes; wipe, and set on gridiron, with stem-end down, over live coals. When this is brown, turn them over and let cook until quite hot through: place them on a hot dish: dress, when eaten, with butter, pepper and salt."

Tomato Soups.—No. 1. "Take a quart of canned tomatoes, add a pint of hot water, and when all boils add two spoonfuls of flour, mixed smooth with a little cold water. Stir until it boils again, add an onion chopped fine, then let it cook for twenty minutes, stirring occasionally. Strain through a sieve, add a generous piece of butter, salt and pepper to taste, and a tablespoonful of sugar."

No. 2. "One quart of tomatoes, one quart of milk, one quart of water. Boil the water and tomatoes together about twenty minutes, and then add the milk; then one teaspoonful of soda. Let it just boil up. Season as you do oyster soup, with butter, pepper and salt: add crackers if desired."—Mrs. Simon Gerhart.

No. 3. "Meatless Tomato Soup: One quart tomatoes, one quart water; stew till soft; add teaspoon soda; allow to effervesce, and add one quart boiling milk; salt, pepper and butter to taste, with a little rolled cracker; boil a few minutes, and serve hot."—Mrs. D. C. Conkey, Minneapolis, Minn.

No. 4. "Skim and strain one gallon of stock made from nice fresh beef; take three quarts tomatoes, remove skin, and cut out hard center" [none is in my varieties]; "put through a fine sieve, and add to the stock; make a paste of butter and flour, and, when the stock begins to boil, stir in half a teacup, taking care not to have it lumpy; boil twenty minutes, seasoning with pepper and salt to suit taste. Two quarts canned tomatoes will answer."—Mrs. Col. Reid, Delaware, Ohio.

No. 5. "Maccaroni with Tomatoes: Take three pints beef soup, clear, and put one pound maccaroni in it; boil fifteen minutes, with a little salt, then take up the maccaroni, which should have absorbed nearly all the liquid, and put it on a flat plate and sprinkle grated cheese over it thickly, and pour over all plentifully a sauce made of tomatoes, well boiled, strained, and seasoned with salt and pepper."

Tomato Pie.—No. 1. Southern Tomato Pie—"For one pie, peel and slice green tomatoes; add four tablespoons vinegar, one of butter, three of sugar; flavor with nutmeg or cinnamon; bake with two crusts slowly. This tastes very much like green apple pie."—Mrs. Ceba Hull.

No. 2. Mutton Pie and Tomatoes—"Spread the bottom of a baking dish with bread crumbs, and fill with alternate layers of cold roast mutton, cut in thin slices, and tomatoes peeled and sliced; season each layer with pepper, salt and butter. The last layer should be tomatoes spread with bread crumbs. Bake three-quarters of an hour, and serve immediately."

No. 3. Beef Pie and Tomatoes—"Scald the tomatoes: skin and quarter them, and sprinkle with salt and pepper. Bury the meat in a stew-pan with tomatoes: add bits of butter rolled in flour, a little sugar, and an onion minced fine: let cook until the meat is done and the tomatoes dissolved into a pulp."

Ham with Tomato.—"When you are tired of cold, boiled ham, try cooking it this way: Cut the ham in rather thick slices; put in your stew-pan one can of tomatoes which have been run through a colander; add a little chopped onion and celery; stew half an hour: rub a tablespoonful of flour into one of butter: add this to your sauce; season to taste; let it boil up, then put in the ham and cook five minutes."

Tomato Preserves.—No. 1. Preserved Tomatoes—"Take one lemon and one pound of light brown sugar, to one pound of tomatoes. Grate the thin yellow rind of the lemon, then pare off the thick white part which is not to be used, slice it thinly, and remove all the seeds. Scald, and peel the tomatoes. Put water enough with the sugar to dissolve it, and when it is boiling remove the scum and add the tomatoes. Cook slowly for two hours."

No. 2. Green Tomato Preserve—"To one pound of fruit use three-quarters of a pound of granulated sugar. Allow one sliced lemon to two pounds of fruit, first tasting the white of the lemon to be sure it is not bitter. If bitter, use the yellow rind, grated, or shaved thin, and the juice. Put the sugar on with just water enough to melt it, add the tomato and lemon, and cook gently

until the tomato is tender and transparent. Cut the tomatos around in halves, and then quarter the halves. This shape is preferable to slices. This will keep without sealing, but it is better to put it in small jars, as it is so rich that only a little is wanted at a time."

No. 3. "Scald and peel carefully small, perfectly formed tomatoes, not too ripe (Yellow Pear or Plum-shaped and Gold Ball are the best), prick with a needle to prevent bursting, add an equal amount of sugar by weight, let lie over night, then pour off all juice into a preserving kettle and boil until it is a thick syrup, clarifying with white of an egg, add tomatoes and boil carefully until they look transparent. A piece or two of root ginger or one lemon sliced thin to a pound of fruit and cooked with the fruit may be added."

No. 4. Tomato Figs.—"Allow half a pound of coffee-sugar to every pound of tomatoes. The yellow plum tomatoes, or the very small and perfectly smooth red ones are preferred for this method of preserving. Put the sugar on the stove with just water enough to melt it. As soon as it boils, put the tomatoes in whole with the skins on. Draw the kettle back where they will simmer gently. Cook until transparent, about two hours. Skim them out carefully, and drain off all the syrup. Spread them on platters to dry, in the sun, if possible. Sprinkle a little sugar over them while drying, and the next day turn them, and sprinkle again with sugar. Do so for two or three days. When sufficiently dry, pack in boxes. Seven pounds of tomatoes will make two quarts of figs."

No. 5. "Tomato Jam.—Take one-half pound of sugar to one pound of tomatoes, put together in a stone jar and let stand twenty-four hours, then take off the juice and strain it; put it into a porcelain kettle, bring to a boil and skim; then put in the tomatoes with a handful of stick cinnamon tied in a cloth; stir all the time. About ten minutes before removing from the fire, take out the cinnamon and add one teacupful of good vinegar to one gallon of jam. Boil until the jelly will not separate."

No. 6. Tomato Butter.—Among all the "butters" so famous on the old-fashoned farm tables, we fancy tomato butter scarcely found a place. A Pennsylvania housewife recommends it. For a trial mess, "take two and a half quarts of tomatoes and three quarts of apples. Stew separately until smooth, mix well, and add three pounds of sugar, one tablespoonful of cloves and twice as much cinnamon. Boil until thick enough to suit the taste."

Canned Tomatoes.—"These are merely stewed tomatoes sealed in cans while hot. Some points to remember are that freshness is necessary; that overripeness is a fatal defect, and that the later tomatoes are never so good as those which ripen earlier."

A bushel of our kinds will put up fourteen to eighteen cans, while our mothers used to get only eight to ten cans from a bushel of the best sorts, and usually about half of these would spoil in consequence of a green core. It makes a great difference whether or not you have kinds to can that are smooth, solid and which ripen early. See paragraph 28 for kinds.

No. 1. "Tomatoes should be canned in August, when the fruit is in the best condition. It is highly important that the fruit should be perfectly sound and not too ripe, for a single spot of decay will contain a sufficient number of ferment-germs to spoil the entire mass.

"These are the most reliable methods:

"Have a large kettle of rapidly-boiling water on the stove. Wipe the tomatoes, fill a wire basket with them and plunge it into the boiling water until the skins begin to crack. Then plunge into cold water, and remove the skins and the hard part under the stem.

"Mash thoroughly and let them boil quickly until perfectly soft, but not enough to evaporate all the liquid. Then season as for the table. To every quart, allow one teaspoonful of salt, one salt-spoonful of pepper and half a cup of sugar. Cook five minutes longer, then fill the jars almost full. Have ready some butter, melted, strained and boiling hot, in the the proportion of one tablespoonful to every jar. Fill to the brim with the hot butter and seal at once. Olive oil may be used instead of butter. Wrap the jars in paper and keep in a dark place. Examine the jars after two weeks, and if any of them show signs of ferment, turn out the contents and treat as directed in making catsup, which see."

No. 2. "Prepare as in the first recipe, but season only with salt. Let them boil down until quite thick, then fill the jars nearly full, add boiling water to the brim and seal at once. Be careful that no seeds or pulp

run over the edge between the glass and the rubber. Keep the jars wrapped in paper, in a cool place. Use these only for soups and sauces."

No. 3. "The tomatoes must be entirely fresh and not over ripe: pour over them boiling water, let stand a few minutes, drain off, remove the skins, slice crosswise into a stone jar, cutting out all the hard or defective portions. (If my varieties are used, no need of this.) Cook for a few minutes in their own juice, skimming off the skum which rises and stirring with a wooden spoon or paddle: have the cans on the hearth filled with hot water, empty and fill with hot tomatoes, wipe moisture from top with soft cloth, put on and secure covers.

"If tin cans are used, press down covers and pour hot sealing wax in grooves. If put up in glass, put away in a dark place. Either tin, glass or stone cans may be used and sealed with putty instead of sealing wax, it being more convenient."

No. 4. Canned Corn and Tomatoes.—"Scald peel and slice tomatoes (not too ripe) in the proportion of one-third corn to two-thirds tomatoes, put on in porcelain kettle, let boil fifteen minutes and can immediately in glass or tin. (If glass, keep in the dark.) Some take equal parts of corn and tomatoes, preparing same as above, others after cutting corn from the cob, cook it twenty minutes, adding a little water and stirring often: then prepare the tomatoes as above, cooking in a separate kettle five minutes and then adding them to the corn in the proportion of one-third corn to two-thirds tomatoes, mixing well until they boil up once and then can immediately.—Mrs. D. Buxton.

Tomato Pickles.—No. 1. Ripe Tomato Cold Pickle—"Sixteen medium-sized ripe tomatoes, four small green peppers, four small onions, all chopped fine. Then add one cup of vinegar, one cup of sugar, and half a cup of salt. Mix thoroughly, and put up cold."

No. 2. Uncooked Tomato Pickle—"Cut one peck of green tomatoes in quarter-inch slices, sprinkle over them one cup of salt, and let them stand twenty-four hours. Then drain very dry. Slice twelve small onions thin. Mix one small bottle of prepared mustard, two tablespoonfuls of ground cloves, one tablespoonful of ground pepper, and one of allspice. Then into the jar in which the pickle is to be kept, put alternate layers of tomato, spice and onions, until all is packed. Cover with cold vinegar, and let them stand until the tomato looks quite clear, when they are ready for use."

No. 3. Green Tomato Pickle—"Chop enough green tomatoes to make a gallon, sprinkle over them half a cup of salt, and the next morning drain and squeeze dry. Add one teaspoonful each of cinnamon, cloves, whole mustard seed and celery seed. Pour on vinegar enough to cover, and boil twenty minutes."

No. 4. Whole Tomatoes for Winter Use—"Fill a large stone jar with ripe and perfectly sound, whole tomatoes, adding a few cloves and a sprinkling of sugar between each layer. Cover well with one-half cold vinegar and one-half water. Place a piece of thick flannel over the jar, letting it fall well down into the vinegar, then tie down with a cover of brown paper. These will keep all winter, and are not harmed even if the flannel collects mould."

No. 5. Ripe Tomato Pickles—"Pare ripe, sound tomatoes (do not scald); put in a jar. Scald spices (tied in a bag) in vinegar, and pour while hot over them. This recipe is best for persons who prefer raw tomatoes."

No. 6. Ripe Tomato Pickle—"Pare and weigh ripe tomatoes, and put into jars and just cover with vinegar. After standing three days pour off the vinegar and add five pounds coffee sugar to every seven pounds of fruit. Spice to taste, and pour over tomatoes, and cook slowly all day on back of stove. Use cinnamon, mace and a little cloves, or not any, as preferred."

No. 7. French Tomato Pickles—"One peck green tomatoes sliced, six large onions sliced; mix these and throw over them one teacup of salt, and let them stand over night. Next day drain thoroughly, and boil in one quart of vinegar, mixed with two quarts of water, for fifteen or twenty minutes. Then take four quarts vinegar, two pounds brown sugar, half pound white mustard seed, two tablespoons ground allspice, and the same of cinnamon, cloves, ginger and ground mustard. Throw all together and boil fifteen minutes."—Mrs. President R. B. Hayes.

No. 8. Green Tomato Pickle—"Take eight pounds green tomato and chop fine, add four pounds brown sugar and boil three hours; add a quart vinegar, a teaspoonful each of mace, cinnamon and cloves and boil about fifteen minutes, let cool and put into jars or other vessels. Try this recipe once, and you will try it again."—Mrs. W. A. Croffet, New York City.

No. 9. Piccalilli—"One peck of green tomatoes and one head of cabbage chopped fine: mix with them one large cup of salt, put all into a coarse cheese-cloth bag, and let it hang and drain over night. Then chop six large onions and four green peppers, mix them with the tomatoes and cabbage, pour over them enough hot, weak vinegar to cover and drain again. The next morning scald the same amount of good sharp vinegar, and pour over them, add two tablespoonfuls of whole mustard-seed, and when cold it is ready to use."

No. 10. Piccalilli—One peck green tomatoes, sliced; one-half peck onions, sliced; one cauliflower, one peck small cucumbers; leave in salt and water twenty-four hours; then put in kettle with handful scraped horse-radish, one ounce tumeric, one ounce cloves (whole), one-fourth pound pepper (whole), one ounce cassia buds or cinnamon, one pound white mustard seed, one pound English mustard. Place in kettle in layers, and cover with vinegar. Boil fifteen minutes, constantly stirring."

No. 11. Sweet or Spiced Tomato Pickles—"Four quarts cider vinegar, five pounds sugar, one-fourth pound cinnamon, two ounces cloves to seven pounds of fruit." (Think about half-ripe tomatoes will give best satisfaction here). "Scald the vinegar and pour over the fruit. Pour off and scald vinegar twice more at intervals of three days, and then cover all close. A less expensive way: Take four pounds sugar to eight of fruit, two ounces cinnamon, one ounce cloves, one teaspoonful salt, one teaspoonful of allspice."

Tomato Catsups.—No. 1. "One peck of ripe tomatoes, four large onions sliced, three-fourths of a cup of salt, three tablespoonfuls of black pepper, one tablespoonful of red pepper, one tablespoonful of allspice, half a tablespoonful of cloves. Mix all together, and stew them until very soft, about two hours. Just before taking from the fire, add one quart of vinegar, and rub through a colander. Put on to boil again, then seal at once."

No. 2. "Stew the tomatoes until soft, then to every gallon of stewed tomatoes add one-fourth of a pound of salt, one-fourth of an ounce each, of red pepper, pimento, and garlic, one-half of an ounce of ginger-root and of cloves. Stew all together until reduced enough to pour easily, then strain into bottles, and seal with wax."

No. 3. Cold Catsup—"Peel and chop fine half a peck of ripe, sound tomatoes. Grate two roots of horse-radish, and chop fine one cup of onions. Mix all well, and add one cup of salt. Bruise half a cup each, of black and white mustard seed in a mortar, and mix with them two teaspoonfuls of black and one of red pepper, one tablespoonful each, of mace and cinnamon, and two teaspoonfuls of cloves, one cup of sugar, and one quart of vinegar. Mix all these ingredients very thoroughly, and put it into jars.

No. 4. Tomato Catsup—"One peck of ripe tomatoes, cut up, boil tender and sift through wire sieve; add one large tablespoonful ground cloves, one large tablespoonful allspice, one large tablespoonful cinnamon,

one teaspoonful cayenne pepper, one-fourth pound salt, one-fourth pound mustard, one pint vinegar. Boil gently three hours. Bottle and seal while warm."

No. 5. Tomato Catsup—"One gallon tomatoes (strained), 6 tablespoonfuls salt, three tablespoonfuls black pepper, one tablespoonful cloves, two tablespoonfuls cinnamon, two tablespoonfuls allspice, one and one-half pint vinegar; boil down one-half. One peck tomatoes will make one gallon strained."

No. 6. Tomato Soy—"One-half peck tomatoes, one large pepper cut fine, one large onion cut in slices, one tablespoonful each of ground allspice, black pepper and celery seed, one-fourth cup of salt, one-half pint of vinegar. Boil all together slowly one hour; cool, and bottle for use."

No. 7. Green Tomato Catsup.—"One peck green tomatoes, one dozen large onions, one-half pint salt; slice tomatoes and onions. To layer of these add layer of salt; let stand twenty-four hours, then drain. Add one-fourth pound mustard seed, three desertspoons sweet oil, one ounce allspice, one ounce cloves, one ounce ground mustard, one ounce ground ginger, two tablespoonfuls black pepper, two teaspoonfuls celery seed, one-fourth pound brown sugar. Put all in preserving pan, cover with vinegar and boil two hours.

No. 8. "Half bushel tomatoes, four ounces salt, three ounces green peppers, one ounce cinnamon, one-half ounce ground cloves, one drachm cayenne pepper, one gallon vinegar. Slice the tomatoes and stew in their own liquor until soft, and rub through a sieve fine

enough to retain seeds and boil the pulp down to the consistency of apple butter (very thick), stirring steadily all the time to prevent burning; then add the vinegar and a small teacup of sugar and the spices, boil up twice, remove from the stove and let cool to bottle. Those who like onions, may add a half dozen medium sized ones peeled and sliced about fifteen minutes before the vinegar and spices are put in."—Mrs. M. M. Munsell, Delaware, O.

No. 9. "Take one bushel fine, ripe tomatoes, wipe them off nicely and put in porcelain kettle. Place over fire and pour over them about three pints water, throw into it two large handfuls of peach leaves with ten or twelve onions, or shallots cut fine; boil till tomatoes are done, or for two hours; then strain through a course mesh sieve, pour the liquid back again into the boiling kettle and add one-half gallon good cider vinegar, have ready two ounces ground spice, same ground pepper, same mustard, whole; one ounce cloves, two grated nutmegs, two pounds light-brown sugar, one pint of salt; mix well together, put in kettle and boil two hours, stirring continually to prevent scorching. If it is desired to "hot," add cayenne pepper to your taste. When cool, fill bottles, cork tightly, seal with wax, keep in a dry, cool place."—G. D., Baltimore, Md.

No. 10. "Take one gallon of strained tomatoes, four tablespoonfuls of salt, one and a half of allspice, three of mustard, eight pods of red pepper; grind the articles fine, simmer slowly in strong vinegar three or four hours, then strain through a hair sieve, and bottle.

Enough vinegar should be used to have half a gallon of liquor when the process is over."

No. 11. "Cut up ripe tomatoes, boil soft and strain; put them on again and boil half down; then to every three and a half gallons of juice, put twelve tablespoonfuls of salt, six of pepper, one of allspice, one of mustard, one of mace, one-half of cloves, one of ginger, six small pods of red pepper chopped fine; boil hard one hour."

No. 12. "To one and a half bushel of tomatoes use the following spices: Three ounces of cloves, two of allspice, a little cayenne pepper and plenty of black pepper and salt, and a pint of vinegar to each gallon; tie up a few onions in a bag and boil with the catsup; boil half down."

No. 13. "One-half peck of Tomatoes, run through a sieve; one teacupful of salt, one of mustard seed, six red peppers, three tablespoonfuls of peppers, one-half gallon of vinegar, piece of horse-radish, one teacupful of nasturtions, half a cup of celery seed. Do not cook, but seal tight in bottles."

No. 14. Tomato-Mustard—"Take one peck of tomatoes, cut them into a porcelain kettle, boil until soft, rub through a sieve, put the pulp back in the kettle, and boil until quite thick: take one teaspoonful of cayenne pepper, one of white, half a one of cloves, two of mustard, one tablespoonful of salt. Let all boil together a few minutes, then stir in half a pint of vinegar. When cool, bottle and cork tightly."

Tomato Salad.—"Take the skin, seeds and juice from nice, fresh tomatoes, chop what remains with celery and add any good palatable dressing."

Tomato Sauce.—No. 1. "Place on fire, tomatoes washed clean, broth, onion, parsley and seasonings: boil to a pulp—about thirty-five minutes; rub through fine sieve, return to fire, stir in butter, and serve."

No. 2. "Pare, slice and stew tomatoes for twenty minutes, strain and rub through a sieve; put into sauce-pan with a little minced onion, parsley, pepper, salt and sugar. Bring to a boil, stir in a good spoonful of butter rolled in floor; boil up and serve."

No. 3. "Stew ten tomatoes with three cloves and salt and pepper for fifteen minutes (some add a sliced onion and sprig of parsley), strain through a sieve, put on a stove in a sauce-pan in which a lump of butter the size of an egg, and level tablespoonful of flour have been well mixed and cooked; stir all until smooth, and serve. Canned tomatoes may be used as a substitute."

No. 4. "For green tomato sauce, cut up two gallons of green tomatoes, take three gills black mustard seed, three tablespoons dry mustard, two and a half of black pepper, one and a half of allspice, four of salt, two of celery seed, one quart each of chopped onions and sugar, and two and a half quarts good vinegar, a little red pepper to taste."

Tomato Omelette.—"Skin two or three tomatoes, cut in slices, fry in butter, beat up some eggs to make omelette, season with salt and pepper, warm some butter in pan, put in the eggs, stirring well to keep from adhering, mix in tomatoes, turn out omelette on plate, doubling it in two. Another nice way is to roll up tomatoes in omelette and serve with tomato-sauce."

There is one thing all tomato-eaters should remember, that the flavor of a tomato is very delicate. It escapes readily with much handling, shaking, knocking or hauling about. Get it and consume it when it comes as directly from the vine as possible. Let market-gardeners also catch the hint. Hurry to the kitchens of your customers with as much care and celerity as you can. They will taste all the better, and so increase the demand for your productions. I do not believe, that the full use to which tomatoes can be put, has as yet been attained. I sincerely ask all expert or amateur cooks, who have a good way of using them, to send us the recipes for same, and it will find a place in our next edition. I heartily commend such to try other methods of using tomatoes, as may be suggested to them; and, if they prove valuable, let us know about it.

64. The Extent of Tomato Culture.—My readers will be impressed with the greatness of the business about which I have written, by statements like the following: "It ranks next in importance to that of Irish potatoes. It is well for us to know the best methods of cultivation, so as to produce the greatest quantity, with best quality, and *when* we need them *most*." I hope this book will meet that felt necessity to a reasonable degree. "A single county in Maryland has over $1,000,000 invested in the canning business."

"The people of Cobden, Ill., are particularly proud of their tomato crop, and on this popular vegetable the town 'does herself big.' She has been known to ship

thirty-three carloads of tomatoes in one day, and this does not include several carloads hauled over to Mountain Glen, a town on the Mobile & Ohio Railroad, and within a few hours after this great train load was sent off, at least fifty carloads more could have been picked."

From the Virginia Experimental Station, as follows: "Few are aware how important the cultivation of special crops is now becoming in Virginia. In all the Eastern States, in fact, the tendency of agriculture is in the direction of specialties, and the tiller of the soil who would not fall behind in the race must recognize this fact. As one among such special crops, the culture of tomatoes holds a high rank. Statistics sufficient to give definite information in regard to the money value of this crop in Virginia have not yet been collected by the Station. Judging, however, from general statements, there must be in this State no less than *eighty*, and probably as many as *one hundred*, canneries working on this crop, either alone or in conjunction with other fruits. In addition to this, the market crop grown in the vicinity of Norfolk and on the Eastern Shore, will reach about one-half the value of that used in the canneries. Hence, it seems fair to say that the value of the tomato crop grown for these two purposes alone—for the canneries and for market—cannot fall short of *one million dollars* annually. This takes no account of what is grown in a general way for local markets and home consumption. As already stated, the estimation is not based upon an accurate knowledge of facts, but there is every reason to believe that it is within bounds."

Prof. W. H. Bishop, Horticulturist of the Maryland Experimental Station, has the following to say of the business in that State: "To-day the tomato may be classed as one of the most important garden vegetables, and, in fact, its culture has so far extended beyond the limits of the garden that it is rather a field crop than a garden crop. In Maryland alone there are not less than twelve thousand acres yearly devoted to growing this crop, and only about one-fourth of the acreage of the country is found in this State. There are two hundred packing houses in this State that devote the whole or part of the season to canning tomatoes. The prominence and magnitude of this industry have induced us at the Maryland Experiment Station to give special attention to the questions affecting the grower and packer."

The growing of tomatoes is fast spreading into newer countries for the older countries to consume, as the following clip from a recent number of the "American Agriculturist" will show: "Efforts are being made to establish a trade for South African tomatoes and potatoes in London. Tomatoes would be needed in the London market during January, February and March, and potatoes during February, March and April, and it is urged that the latter be grown in red soil where possible. The London vegetable dealers are prepared to pay from one and one-half to two cents per pound for tomatoes, which would pay the farmers, one of whom guarantees to supply from eighty to one hundred tons of the Acme and Perfection varieties." It also shows what kinds are reaching from American soil to London mar-

kets, and then from "the survival of the fittest" there, finding its way into "Darkest Africa."

I now quote in full from the "American Grocer" of New York, January 11, 1893. This need not be read, but is placed here for reference, to show what the business was when this volume was written:

TOMATO PACK—1892.

"We take pleasure in presenting our thirteenth annual report of the pack of tomatoes throughout the United States and Canada. The total output is slightly behind that of 1891, the shortage amounting to 38,673. It appears, however, that the total output is above the average of the past six years and slightly behind that of the past three years. It is apparent that the present consumptive requirements of the country are beyond the average annual pack for six years of 3,179,214 cases. It is certain that the total output of 1892 will have passed into consumption long before another season's operations have commenced. Had it not been for the very favorable weather toward the close of the season, throughout New Jersey, the shortage would have been much larger. In the West there was a great falling off in the output. Wherever a shortage occurred, it was due to unfavorable climatic conditions.

"We separate the report of Canada from our usual tables this year because that market is practically closed to the United States. The pack in Canada this season was comparatively heavy. Tomatoes are selling in Canadian cities at 75 cents per dozen. Were it not for

the duty of 45 per cent. they might be available for use in the United States. Here is an instance of the wisdom of the McKinley tariff in protecting American canners against the competition of Canadian packers.

"Throughout the season there has been an unsatisfied demand for high grade goods. It is gratifying to note that there is a steadily widening market for fine brands and that consumers evidence a willingness to pay for quality, even if some jobbers are reluctant to discriminate between standards and extra, to the extent packers deem remunerative for the extra expense their packing involves. There has been a difference of from 10 to 25 cents per dozen between the price of brands, due wholly to variations in quality and the estimation put upon brands by the retail trade and consumers. Established labels that have represented high and uniform quality command full prices.

"As usual our statement is based on actual returns received from packers and commission merchants, to all of whom we return thanks for their prompt answers and willingness to institute special inquiries. The following table, the pack of 1892, in comparison with that of 1891."

PACK BY STATES.	1892.	1891.
New Jersey	862,692	950,833
Maryland	977,742	744,010
Indiana	282,717	341,217
California	230,943	218,311
Delaware	175,700	264,950
New York	146,290	114,774
Virginia and West Virginia (2000)	60,386	98,360
Iowa	57,500	94,800
Ohio	87,840	90,590
Missouri	64,621	90,350
Michigan	39,602	73,506
Illinois	42,200	68,324
Kansas	30,833	50,700
Utah	55,000	.....
Nebraska	2,210	26,900
Pennsylvania	18,950	15,000
Connecticut	14,750	14,400
Colorado	39,262	12,600
Massachusetts	6,557	10,000
Kentucky	2,200	10,000
Arkansas	2,500	14,500
Tennessee	.....	6,840
Texas	100	4,500
North Carolina	1,5 0	3,900
South Carolina	7,500	.....
Alabama	1,170	.....
Georgia	12,400	3,000
Total United States	3,223,165	3,322,365
Canada	143,627	83,000
Total United States and Canada	3,366,792	3,405,365

"The above table represents the minimum number of cases packed. Many new factories have been started in the Southern States and some of them have not reported. The total output in 1892 compares with the pack of previous years as follows:

	Cases of Two Dozen Tins Each.
1892	3,366,792
1891	3,405,365
1890	3,166,177
1889	2,976,765
1888	3,343,137
1887	2,817,048
Total for six years	19,075,284
Average per year	3,179,214
Average per years 1890–1892	3,312,778

"Since our last we have chronicled the death of Mr. Harrison W. Crosby, to whom belongs the credit of first introducing canned tomatoes, packed in tin cans, as an article of trade. He lived to see the industry expand from an experimental point until it was located in nearly every State in the Union. Mr. Crosby's first pack was put up in 1848, while he was a steward at Lafayette College, Easton, Pa. A common iron sink was used as a bath. What great advantages have been made in the application of steam and machinery, whereby the cost has been reduced from 50 cents per can, at which prices they sold in 1848, to an average of 7 cents per can for the past seven years! Demand has increased and the supply expanded, while the cost has steadily declined."

Market Review.

"The year opened with confidence in the market. Although the pack of 1891 was the largest for years, it was not beyond the requirements of the country. It was apparent early in the year that there would be no carry over, as in the days gone by, when new season's goods were met by tomatoes anywhere from one to four years old. The Western Packers' Association held about 80,000 cases at the beginning of the year. In March the trade began making contracts at 87½ cents delivered for New Jersey brands. April was a quiet month so far as sales for future delivery were concerned: the spot market was inclined to easier figures.

"In May there was renewed demand for contracts. Early in the month a favorite New Jersey pack was sold at 85 cents, delivered here. Harford County No. 3 offered at 75 cents per dozen net cash f. o. b., and No. 2 tins at 57½ cents. San Francisco reported sales for future delivery at 75 cents, less 1½ per cent. for No. 3 tins. In June offerings were light, but prices did not advance. Sales on contract were freely made at 75@77½@80 cents f. o. b. Harford County. During the summer spot stock continued scarce and high. In July New Jersey brands sold at 87½ cents and Delaware brands at 85 cents for forward delivery. San Francisco quoted 80@82½ cents. Some fears were expressed at this time as to the crop, there being too much rain and too many bugs. Late in the month the market for futures was 2½ cents higher. Spot stock also improved, so that 90 cents was obtained in Baltimore and 92½@95 cents in New York. August opened with free sales of futures at 87½@90 cents for New Jersey brands; 82½@85 cents for Harford County.

"Deliveries of 1892 tomatoes commenced about the middle of August, causing a drop in quotations for spot. The quality of the first shipment was not of a high order. Reports during August were not favorable for a large pack, particularly in the Western States. Drouth caused an active demand to spring up, brokers reporting heavy sales in early September, chiefly from the West. Sales were made at 80 cents cash, f. o. b. Harford County, for large blocks. The market was firm throughout the month, with light offerings, as dry weather continued

and fears were expressed for the result in the Atlantic Coast States.

"Toward the close of September and early in October, the weather in New Jersey, Delaware and Maryland was very favorable for tomato vines, the canneries running full time and some working nights. This weather continued for some time, so that the estimated shortage in the pack was overcome. The market continued to rule in packers' favor, as it was apparent that the total supply was to be behind that of the previous year. Ninety to ninety-two and a half cents was readily paid in New York for No. 3 standard, while 85 cents cash f. o. b. was the lowest price in Harford County. In November some of the heaviest operators in the country reported their stocks the smallest held at that time for several years. The demand continued good until the close of the year. Prices ruled in sellers' favor and closed firm at one dollar, at which price sales were made.

"The following range of prices for the year in New York, Philadelphia and Baltimore will convey an idea of the condition governing the market throughout the year. The figures represent prices for good standard No. 3 tins, and generally represent grades of that quality and not such as are regarded extra."

"The following table gives the range of prices for each month in the year for standard No. 3 Tomatoes in New York, Philadelphia and Baltimore:

	N. Y. & N. J. No. 3.	Philadelphia.	Baltimore.
January	$0 85 @ 90	$0 75 @ 77½	$0 75 @ 80
February	82½ @ 90	77½ @ 80	80 @ 82½
March	85 @ 90	80 @ 82½	80 @ 82½
April	82½ @ 87½	80 @ 82½	80 @ —
May	82½ @ 85	80 @ 82½	80 @ —
June	85 @ 87½	82½ @ 85	82½ @ 85
July	87½ @ 92½	82½ @ 85	85 @ 90
August	90 @ 92½	85 @ 87½	85 @ —
September	90 @ 95	77½ @ 80	82½ @ 90
October	90 @ 92½	82½ @ 85	87½ @ 90
November	90 @ 92½	85 @ 87½	90 @ —
December	92½ @ 1 00	87½ @ 90	90 @ 1 00

"The following table gives the highest and lowest prices for standard grade of Tomatoes in No. 3 tins in the New York market for seven years:

Highest and Lowest.	1892	$0 82½ @ 1 00
	1891	80 @ 85
	1890	77½ @ 1 00
	1889	82½ @ 88
	1888	90 @ 1 05
	1887	95 @ 1 10
	1886	88½ @ 1 15

"The following table brings into comparison the price of No. 3 standard Tomatoes in Philadelphia on January 1, each year for the past nineteen years:

Jan. 1—		Jan. 1—	
1893	95	1883	1 00
1892	75@80	1882	1 22
1891	75@80	1881	1 10
1890	75	1880	1 20
1889	92½	1879	90
1888	97½	1878	1 90
1887	90	1877	1 70
1886	90	1876	1 50
1885	75	1875	1 30
1884	80		

NEW JERSEY.

"New Jersey loses its place as the banner State, Maryland taking that honor. The output in 1892 was 862,692 cases, falling off from the preceding year 88,141 cases. The season opened about a week later than in 1891. Most of the houses opened between Aug. 20 and Aug. 25, while some did not commence operations until early in September. The packing closed at most places between Oct. 15 and Oct. 25. The first setting of fruit was marketed in good shape, but the second setting was injured by dry weather, and for a time fears were entertained for the pack, but late in the season climatic conditions were exceedingly favorable; so much so that the expected shortage was reduced to the small quantity noted above. Messrs. Kirby Bros. and Mrs. Sarah Aldrich, of Burlington; Messrs. Brown & Dunn, of Trenton; the Diamond Packing Co., and West Jersey Packing Co., of Bridgeton; Chamberlain & Co., of Mercer County, are among those who discontinued work during the year. Among the new factories was the Hopewell Valley Canning Co. at Hopewell."

DELAWARE.

"Delaware falls behind last year 89,250 cases on account of drouth. In some sections of the State the pack was very light, about one-half that of previous years. The factories opened between Aug. 20 and the first of September, and closed between Oct. 15 and 27. The old firm of Calhoun and Thoroughbred was termi-

nated by the purchase of Mr. Thoroughbred's interest by Geo. C. Calhoun. Their factory is located at Georgetown. J. N. Maxwell operated the factory formerly run by Carsins & Maxwell. The factory of A. W. Small, at Lincoln, was operated by Thomas U. Marvell. Among the factories discontinued were Macklin & Co., at Georgetown, Thomas Dutton, at Redden and one at Shelbyville."

NEW YORK.

"The packing in this State did not begin until about the first of September, although one or two houses started operations a few days earlier, and some not until the middle of September. The pack terminated early owing to frost. Many houses packed none. The New York State Preserving Company, at Buffalo, was discontinued. The factory at Fairport, formerly operated by C. & H. J. Burlingham, was operated by Howard Thomas.."

MARYLAND.

"There were quite a number of factories discontinued in Harford County, during the past year, while we have added a few names. The packing opened early, some houses getting at work during the first week in August. The season terminated at various dates in October, some houses not closing until nearly the end of the month. Some of the packers report a yield of 400 bushels of fine Tomatoes per acre. One of the packers writes that he finds it very profitable to sow seed as early as February, and to get strong plants out

about the first of May. He is of the opinion that the early grown fruit is far superior to the late crop. Taken altogether, the season in Harford county must be considered a good one. Had it not been for drouth the pack in Harford county would have been heavier. In some sections the yield was cut down one-half by dry weather. The pack of the city of Baltimore was ahead of last year. It reached a total of 373,000 cases. We do not count in the Baltimore estimate, Tomatoes packed out of the city, but carrying the label of Baltimore packers."

CALIFORNIA AND UTAH.

"The season opened about the first of September and closed the latter end of October. One house reports not having closed until the first of December. Utah figures in our table for the first time. Three factories in the Territory report an out-put of 55,000 cases."

INDIANA.

"The season in this State opened early in August and terminated during the last half of September. There were a number of new factories in the State, one each located at Seymour, Ewing, North Indianapolis, Knightstown, Monticello and Spiceland. Several factories in this State packed an average of 30,000 cases each."

ILLINOIS.

"The pack in Illinois was 26,124 cases behind that of last year. The season opened late—not until the last part of August, and closed during the last fortnight of October. The crop was poor.

IOWA.

"This State falls behind last year 37,300 cases. The season opened toward the end of August and continued until the latter part of October. The factory of The Potter Canning Company was removed from La Motte to Wyoming. The factory at Fairfield was discontinued."

MISSOURI.

"Most of the factories commenced work about the first of September. One or two began operations during the early part of August. There was a new factory at Odessa and also one at Independence."

KANSAS.

"The crop was late. Several factories did not pack so that there was a deficiency of 19,867 cases as compared with the small total of last year."

THE SOUTH.

"There have been a large number of small factories started at various points in the Southern States. As a rule, these houses turn out a small quantity, say 1,000 to 1,500 cases, for which they find a local market. One factory in Georgia commenced in July and stopped in October with an output of 5,000 cases. Another in North Georgia also packed 5,000 cases. One of them put up 25,000 cases of peaches. The factory at Griffin, Ga., was discontinued. In Alabama the Tomato crop was a failure and almost nothing was done in Texas and Arkansas."

OHIO.

"The crop was very good in quality, but deficient in quantity. The season commenced from the 5th to the 20th of August."

VIRGINIA.

"There were quite a number of factories discontinued during the year. The season opened all the way from the first to the latter part of August, and closed at various dates in October. There was only a partial crop."

From the above report, which is as accurate as is available, we may learn that the consumption of Tomatoes is ahead of the productions averaged for the last six years. Also that the production fell short last year and the stock on hands will be consumed long before the new ones come into market. This means, as we reason, that the Tomato growing and canning business is likely to be good for several years to come.

Another thing is clear from this report, viz: That "high grade goods" are in demand. Of course there is more *risk* to aim for this, but there is also more *gain* if you can make it win.

The prospect for Tomato culture, in my judgment, was never more flattering. There is no end to newer and better developments in the business in kinds, culture, appliances, harvesting and selling. I was much interested in a statement in a recent number of the Rural New Yorker, as illustrative of "something new," which I here give as follows:

"It occurred to the writer last year that the Tomato might possibly be induced to become a tuber-bearing plant. He reasoned that the Tomato berry or fruit is structurally the same as the potato berry or fruit; that the wild potato bears very small and very few tubers, while it bears lots of fruit; that cultivation alone has reversed this, causing a maximum of tuber and a minimum of fruit. Accordingly several Tomato plants set out last May have been disbudded as soon as the buds have appeared. The plants have grown to twice the usual size of those which are allowed to bloom, and to bear all the fruit they will. The effect on the roots is not yet known. Probably such plants will have to be propagated by cutting through several or many seasons, never allowing them to bloom, before it can be decided whether the Tomato may or may not be forced into a tuber-bearing plant. The suggestion is offered to our station experimentors for what it may be worth."

Would it not be strange indeed, if in a few years we were to have tuber-bearing Tomatoes as common on our markets, and as much sought after as the Irish potato is now? And yet stranger things have happened than this! I trust the Rural and other reliable papers will follow this up till it is known what can be done for us all in this line.

Well, we have now been together for a long time, a whole season through, over these Tomato affairs in the world. I trust you *have been* not a little interested in reading and *will be* not a little profited by trying to do the things I have suggested to you on these pages.

ALPHABETICAL INDEX.